This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

No. .....

BOSTON
MEDICAL LIBRARY
ASSOCIATION,
19 BOYLSTON PLACE.

THE

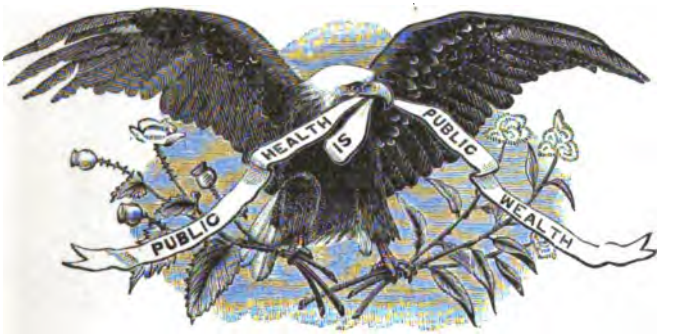
SANITARIAN,

A MONTHLY MAGAZINE

BOSTON MEDICAL LIBRARY ASSOCIATION
JUL 31 1886

DEVOTED TO THE

PRESERVATION OF HEALTH, MENTAL AND PHYSICAL CULTURE.



VOLUME XVII. JULY TO DECEMBER.

A. N. Bell, A.M., M.D., Editor,

T. P. Corbally, A.M., M.D., Harry Kent Bell, M.D., } Associate Editors.

NEW YORK: A. N. BELL.

1886.

Entered according to Act of Congress, A D. 1886, by A. N. BELL, in the office of the Librarian of Congress, at Washington.

CATALOGUED,
L. C. B.
4/22/87.

738

JUL 31 1886

THE SANITARIAN.

JULY, 1886.

NUMBER 200.

THE HYGIENE OF NATURE; OR, NATURAL SELECTION AND IMMUNITY FROM DISEASE.

By Dr. ROMAINE J. CURTISS, Professor of Hygiene in the Joliet, Ill., College of Physicians and Surgeons, Chicago, Ill.

NATURAL selection, a general law of biology discovered by Charles Darwin, who, many people will probably remember, is now dead, is, as I understand it, made up of a few or several factors. These factors are variation, heredity (sexual selection), and atavism. I give this outline sketch of the subject, not because it is new, but because in the haste for new biological discoveries and priority of claims in discovery Charles Darwin and natural selection seem to be forgotten, or, at least, are not duly mentioned.

It is generally agreed, I think, among astronomers, that Newton discovered the law of gravitation—a general physical law. I think every astronomer nowadays who is working among the specialties of astronomy generally uses the law of gravitation—in his physics and mathematics—to determine astronomical problems, and does so without pretending priority in the discovery of this law, or that he has discovered a new name for the old laws of Newton and Kepler.

But it appears that this rule does not obtain among gentlemen who are investigating biological problems, especially those gentlemen who are studying the phenomena of immunity from disease that may be given by inoculation and vaccination. Even Pasteur, and Tyndall, and many writers in our own country, as well as original investigators and experimental students, ignore or do not happen to think of the general law

of natural selection as the fundamental or general force which explains the phenomena of the biological world.

In relation to personal claims of priority in a discovery relating to the cause of immunity from disease, I refer to THE SANITARIAN for February, 1886. James Law, F.R.C.V.S., in this number has an article stating a claim of priority over Dr. Sternberg and others in the discovery that acquired immunity in disease of infectious nature is due to a developed or acquired "vital resistance" of the cells and other morphological elements to the poison of microbia, or to the microbia themselves.

A few years ago a certain astronomer discovered that the planet Mars was furnished with moons. The discovery created considerable popular, as well as scientific, excitement. The astronomer discovered also the orbits of the moons. Suppose this astronomer had, when he was through with his work, announced as a discovery of his own that in studying the physics and mathematical relations of these moons that their formation, originally, was to be explained by a new discovery —the nebular hypothesis, and their orbits were due to a certain new discovery of his, which was that "all bodies" (not living) "attract each other inversely as the square of their distance, and directly according to their mass."

The only inference, in such a case, would be that the discoverer of the moons had also discovered the "nebular hypothesis" and law of gravitation while studying the phenomena of these moons, or else he simply ignored the discovery of Newton.

To refer again to biology, in further illustration of this analogy, suppose that a man observes that prairie wolves will chase antelopes, and suppose he discovers that when the wolves catch the antelopes they eat them. Then suppose, further, that such observer could have the power of watching this process for several generations of wolves and antelopes, and finds that in the long *run* the generations of antelopes acquire speed faster than the wolves do (having greater resources), and that in time the antelopes all get away and the wolves all perish. Now, to complete the analogy, this observer, we will say, makes a report, and, instead of saying that the antelopes are saved by natural selection, says that they are saved by greater speed, as the specific character of

"vital resistance," which they have acquired by conflict for life with their natural enemies.

Now, in such a case as this, it is due to say of this observer that he is either ignorant of the law of natural selection, or else he has actually *almost*, himself, made the discovery of this great law over again, independently of its great discoverer—or possibly he simply has the audacity to ignore the fact that the great biological law of natural selection is a matter of public knowledge.

THE FUNDAMENTAL CAUSE OF DISEASE.

In studying this subject I refer, of course, to the parasitic diseases in general, and in special to the diseases caused by microbia, or vegetable parasites. Looking at this subject from the moral as well as pathological standpoint, we are reminded of the holy text which reads that death came into this world by sin. I think we are sufficiently well acquainted with death, but I think the discoveries of late years will give us a clew to the definition of sin as related to the infectious diseases. I think the sin consists in the fact that all living things consume each other for a living when they can, and that the fundamental cause of infectious disease is that all living things were created with an appetite for each other.

There is practically no difference, we observe, between the natural conflict of wolves and antelopes, and tubercle bacilli with the cells of certain tissues of the body which cannot resist them. The object of the warfare is the same in each case. The method is different, but the results are just the same. The wolves slay by speed and tooth and claw for the purpose of eating their natural prey, and destroy all antelopes which cannot resist them by the "vital resistance" of speed; while tubercle bacilli, in the glands of the body, will poison to death the cells which cannot resist the poison by vital resistance, and consume the cells as their natural prey. On the other hand, the antelopes which can acquire speed by being chased will escape, while the cells which can acquire immunity or resistance, through conflict with a poison, will escape.

The terms of these analogous propositions are alike in every feature. The motives and necessities are the same in each case. As a rule, the ultimate results are the same. The fact that sequent wounds cause death in one instance, and sequent

disease in another, makes no difference. In each case there is vital necessity and appetite on one side, and vital resistance, which is acquired, on the other side. They are equal problems in biology, and it follows that if the phenomena of one are due to the law of natural selection, as a result of the law that all living things were created with an appetite for each other, that the other is also a result of the law of natural selection. It is also true that one presents the phenomenon of "vital resistance" just as the other; but "vital resistance," like every other morphological and physiological factor of living things, *is a result of natural selection*, just as the phenomena of astronomy are the result of the general law of gravitation.

But it will be found that the same law will apply to all other diseases, as well as the infectious or parasitic diseases. The most general relations of adaptation of all living things are of two characters; the first is the adaptation of living things to each other, and the second is the adaptation to all other things and phenomena in their environment. The infectious diseases are resultants of the animal's adaptive power to parasites, while other diseases, including injuries, are resultants of the animal's adaptive faculties and acquirements toward things and phenomena in its environment.

To specialize the first of these general laws, I may cite an instance of conflict between the tissues or cells of a man and the parasites of variola. The man is duly exposed, and the microbia enter his blood. Once in the blood the parasites go to every tissue and organ, but meet their least "vital resistance" in the tissues of the skin, for the reason that other tissues have acquired a greater resistance by reason of greater powers of variation, through centuries and generations of combat and inheritance. But, in addition, suppose the man has been vaccinated at some period of his life. His adaptation to the parasites will then depend upon the degree of protection thus gained—less the degree of immunity that is necessarily lost by time and that factor of natural selection known as atavism. These factors will determine the nature of the man's adaptation to the parasites of small-pox, and will therefore determine whether the resultant will be a case of varioloid or confluent small-pox; and, as any one will infer, the degree of "vital resistance" which the man may have to the poison of

the small-pox parasite, he has acquired through the action of the biological law known as natural selection—or variation, hereditary transmission, and atavism.

Specializing the law that these same rules hold good among the environing causes of death in the physical world, I will mention the "vital resistance" which people may acquire to cold. As is well understood, every man's tolerance of extreme cold depends upon, if other things are equal, his exposure to the influence of cold. He acquires a vital resistance to cold in no other way. A late writer says that he saw Esquimaux mothers giving their children a snow-bath in the drifts outside of the snow-house when the temperature was from 40° to 60° below zero. The children appeared to enjoy the bath, naked as they were, fully as much as the children of the South do their bath in comparatively hot water.

Now, the Esquimaux children have acquired by natural selection a "vital resistance" to a degree of cold which would certainly cause the death of the children of the South, who have not acquired such a resistance; and they have acquired it by precisely the same method, in general, that the man acquired his immunity from small-pox. They both acquire their immunity by exposure to or combat with the cause of disease.

With this outline of the general relations of natural selection to the causes of disease, I will consider the

SPECIAL RELATIONS OF THE FACTORS OF NATURAL SELECTION TO IMMUNITY FROM DISEASE.

As given, the factors of natural selection are variation, heredity (sexual selection), and atavism.

VARIATION.

In speaking of the factors of natural selection, my object is to show their special relation to disease rather than their general biological relations. We understand by variation a change in the original morphological type of any classification or type of any anatomical structure, or genera, order, or species. The law of reproduction is that like produces like subject to variations.

The cause of variations is sometimes known, but generally

unknown. When known the action of the cause can generally be explained; when unknown the variation is sometimes said to have a "spontaneous" cause. Of course there is no such thing as "spontaneous" action in nature. Whenever there is a variation there is always a natural cause, and the cause generally acts after the following manner: Taking living things, we find actions and reactions between them, and also between them and the physical world; and we also find that wherever there is such action and reaction there is always a resultant variation. Now, we may say further, that this action and reaction are most always in the nature of a conflict. The whole universe is run on this plan and basis of conflict. To specialize both factors of the problem—the biological and physical conflicts—I will give an instance or two. A doctor prescribes morphine in one-eighth grain doses for his patient's pain. If the pain continues the morphia can be increased; the patient can become an opium-eater and take a bottle of morphia every two days. The same law will hold good with nearly if not all other poisons. We have here the whole exhibition of conflict or action and interaction between a living thing and a physical cause, with a variation on the part of the tissue cells which enables them to resist the poison. Now, this variation in all its morphological features cannot be distinguished by the microscope, but is an inference by analogy. However, if a doctor takes a vacation, and goes hunting and fishing and rows a boat, he will acquire a new formation in the palms of his hands, as the result of a conflict between the oar and skin cells.

We all remember the experiments of Darwin with the pigeons, and thousands of our best citizens, who talk horse, will unconsciously, in giving the rules for breeding trotters and runners, give a full description of the laws of natural selection, with all the factors and sub-factors. Men of science sometimes lose sight of the laws of natural selection, but horsemen never do. The horsemen know that speed is acquired by a horse being exercised against time and distance, and that speed so acquired is a variation. They know that such speed or variation is transmitted by heredity through sexual selection. The horsemen also know that if trotters are bred indifferently and are driven slowly, generation after generation,

that they will lose the variation which gives them speed, and revert to the ancestral type. The horsemen know this, though they do not understand anything further, specifically, about the biological factor of natural selection, which has been named atavism ; while many of our late writers, who are studying the subject of immunity from disease, and have discovered " vital resistance," though they must know what atavism is, are yet, to all appearance, now making experiments to learn why immunity from disease, acquired by inoculation, will certainly run out in time if the individual lives long enough.

From these data the matter is very clear why and how animals acquire an immunity from disease. The micro-organism and the animal are enemies, and there is a conflict between them, with the result of a variation on the part of both. The character of these variations grows or develops out of the nature of the conflict, and as the microbe fights with a poison, and the tissue cell resists by a specific power of " vital resistance," the nature of the variation here is naturally a change in the morphology of the cell which gives a greater resistance of specific character to this special kind of poison, and, in general terms, is like the " tolerance" that is acquired by the cells from conflict with alcohol, morphine, arsenic, and other poisons.

Looking over the list of microbia, we find that natural selection has given them different kinds of poisons. The spherobacteria all look very much alike, for instance, but the poison of each species is the distinctive feature of the species in all cases, at least in relation to the disease. In addition to this there is a variation of the different species of microbia which is determined by their virulence or the amount of poison they manufacture, and not the kind of poison they make. The difference between the two varieties of the species of small-pox microbe and that of kine-pox is, not in the kind of poison each makes, but in the quantity. The same law holds good in relation to all other pathogenic organisms that are used as a virus for inoculation or vaccination, as swine plague, anthrax, chicken-pox, cholera, and hydrophobia.

If all micro-organisms made the same poison there would be but one disease in the world, or, in fact, by this time no disease, for humanity would have acquired a tolerance of the

poison. Looking at the physiological powers of the sub-kingdom of pathogenic micro-organisms, it will be seen that natural selection has worked here just as it has in the human occupations of the highest civilization. The different classes or species of professions, artisans, and laborers among the people are distinguished, first, by the kind of work they can do, and, next, by the amount of work they can do; both accomplishments being acquisitions in precise accord with the laws of natural selection, as well as are the similar physiological accomplishments of the microbia.

In relation to diseases, the microbia act with the weapon of poison. The reason why is because they are unable to consume the tissues with their feeble powers of osmosis while the tissues are alive. The resistance of the tissue cells to the action of the osmosis of the microbia is originally a "vital resistance." It is the resistance of life in general, but the resistance of the cells to a specific poison of any given species of microbe is a variation of the vital resistance of specific character. It is a truism, therefore, to say that immunity from disease is an acquired "vital resistance;" and yet this phraseology does not tell the whole truth. The immunity from disease is the acquirement of a variation which is of a special character (and not general vital resistance), which special variation enables the cells or tissues to tolerate the special poison of a species (or its variety) of microbe.

We do not say that a horse is a trotter because he is a live horse, nor because he has a vital resistance to time and distance. Such an explanation would never "fill the bill" among horsemen. A more specific definition is required, and we say that the horse has speed, as a special manifestation of his vital forces, and that his great speed is the result of culture after the method of natural selection. And the method of definition employed is as follows: "He is a trotting horse with a record of 2.13¼." Similarly we may say that the inoculation of kine-pox gives a man a specific immunity from small-pox and kine-pox, and that the power of resistance to disease is one of the properties of life in general of a specific character, which is also acquired after the biological methods of natural selection.

It remains now to describe the method of variation in the tissue cells giving rise to immunity. As understood, the

variation can only be brought about by conflict with the poison of any given disease if immunity is secured from this disease. This is, of course, not the whole truth, for it is found that a degree of immunity will also be secured to other diseases, the formula of which probably is that the acquirement of immunity from any given disease will also give immunity from other diseases directly as their poisons are alike.

When microbia enter the system and begin the work of poisoning they, of course, begin small. Some time is required to develop, or incubate, or manufacture enough poison to have a general effect. As most poisons in small doses are stimulants, we generally find what we would expect, that the first symptoms of disease are those of exaltation of the nervous functions, if not a general good feeling. It is very common, and all physicians will give their testimony to the fact, that it is not uncommon to hear a man exulting in the exuberance of good feeling, and within a day or two be taken sick. But the poison begins its conflict. It follows the rule of passing by the resisting tissues and attacking the non-resisting. The violence of the disease depends upon several factors. These are the kinds of poison manufactured, the amount also manufactured (depending somewhat upon the number as well as "virulence" of parasites), and, on the other hand, the amount of specific resistance of the cells, and their resources in the power of variation of the specific character that is required to resist the given poison. These factors, other things equal, determine the resultant, as manifested to us under the name of a disease. The resultant includes, as its factors, the type of disease, the severity, duration, termination, and immunity, as also the duration of the immunity.

As the poison begins to act it selects the tissues which can least resist it, and at once the process of cell death and cell variation is inaugurated. It is fair to imagine what this conflict is like on the basis of its analogy to what happens among the people of a community during an epidemic. Many die, many are poisoned and recover, while in them there is a variation which gives immunity. This being true among the cells, there comes a time, which in most diseases is a very definite time, when all susceptible tissues acquire a variation that enables them to resist the poison, and the result is the "spontaneous" termination of the disease.

HEREDITARY TRANSMISSION.

The law of heredity is a corollary of the law that like produces like. If a variation is acquired by any animal, the law of heredity is that the animal will bequeath the variation to its progeny. Brown Sequard's Guinea pig, which bequeathed acquired epilepsy, and the family of Gratio Kellia, who inherited his six toes and fingers, are good examples of the power of like to produce like. We cannot conceive that, if an immunity is acquired to any disease, more or less of this variation may not be transmitted. It is not true, of course, that if a man is vaccinated his children won't have the smallpox, but such does not disprove the law of inheritance. People may inherit the microbe, or poison of disease, directly from their mother, but, in my opinion, the inheritance of disease has two factors: the first is the inheritance of a weak resistance to the disease, and, second, the subsequent exposure to the causes.

A resistance to disease is acquired not only by cells, tissues, and organs of individuals, but, as follows this naturally, a resistance of certain portions of the public or whole communities ought to occur. I think we will find that it does occur. A community may be exempt from a given disease from the single cause of an acquired immunity. The cause may even be present, and there may occur continually or occasionally a sporadic case or two; but, if other things are equal, the disease is powerless to act as an endemic or epidemic.

These data are all founded on one factor of this problem. There is, of course, another factor of equal importance which relates to the variations undergone by the microbe from disease, and from influences in its environment, and from variations it may undergo from all causes which "attenuate" it or cause it to lose virulence. As is well known, epidemics of scarlet-fever and other diseases are so notably mild, from some reason that has impaired the virulence of the microbia, that people voluntarily expose their children to gain a protection from more virulent epidemics.

But the hereditary transmission of immunity is a weak affair, though it certainly must occur, or else the law of natural selection is not true after all, and I am not acquainted with

any one who feels much like disputing this law from scientific data. It is true that this variation is transmitted, though many, even hundreds of generations, are required to enable any given State, or nation, or community to acquire a complete immunity from any given epidemic or poison, and cause the disease organism to die out.

But the clinical history of disease verifies this observation. The great epidemics of the Middle Ages—sweating sickness, plague, and typhus—are practically dead, and, as can very readily be shown, their death was not compassed by sanitation, but by natural selection.

I suppose that the scope of hereditary transmission in this direction may be defined about as follows: The cells or morphological elements of an individual first acquire, by combat with the poison, an immunity to its action. They transmit this power to their descendent units or factors. The tissues, one after another, acquire this exemption, until all the tissues and organs of the body are exempt. The individual thus protected bequeaths more or less of this exemption to his progeny (subject to atavism), until in time all the people of a community, like all the tissues and organs of the man, are exempt or are selected by nature, or by variation, heredity, and atavism, to survive because they have conquered the micro-organism. In such a case, in relation to cells, tissues, persons, and communities, the germ is powerless, and must die out, at least for a time; and such is the basis for the law of the "self-limitation" of diseases, the limitation of epidemics, and also is the reason why the great epidemics of the Middle Ages have ceased operations.

ATAVISM.

The law of natural selection is that when a variation is brought about, if the causes which brought about the variation are removed, then the variation will be lost, and whatever it was that was so developed will return to its ancestral type, or assume the character it had before. Common observation verifies this fact. The doctor who rows a boat and gets a callous on his palm finds that when he returns to practice the callous is absorbed and disappears. Throughout all living nature, with perhaps the usual exceptions found to all

rules, this rule of atavism holds good. If it is true, therefore, that immunity from disease is the work of natural selection, it must be found that persons and communities who acquire an immunity from disease afterward lose it, and we find this to be true. Even State boards of health have learned that vaccination, in order to be efficient, must be repeated. The protection it gives lasts but a short time. Many people live long enough to have small-pox, and vaccinia, and possibly varioloid, and many more have the measles, scarlet-fever, and many other diseases, two or three times over. The explanation scarcely need be given. The presence of the poison creates an immunity. Then the poison is removed, and the variation necessarily, by atavism, is lost, and another exposure will bring on another attack of the disease. It is reasonable to suppose that in any given disease the inoculation of the less virulent poison of a modified or attenuated microbe will cause a less variation, which is sooner removed, by atavism, than is the variation or immunity that is given by the more virulent microbe. Protection lasts longer after small-pox than after varioloid or vaccination.

VARIATION OF MICROBIA.

Variations of the microbia occur in nature, and are also accomplished by artificial culture, by various processes called "attenuation," "dilution," "modification," etc. These terms represent new discoveries, of course, of gentlemen who are practical workers in the field, but who somehow do not use the terms variation, atavism, or hereditary transmission for any of their methods, or results of their methods. However, all the various processes employed artificially, as certainly those occurring in nature which lessen or increase the virulence of microbia, are the same old methods of natural selection—variation, hereditary transmission, and atavism. The variation of microbia is necessary in all inoculations. The methods employed are various, but the result is invariably the same, and is always a variation of the species of micro-organism giving it less virulence. It produces the same kind of poison, but a less quantity. The less quantity may, of course, be in part due to a less reproductive power, so that a less number of organisms are produced.

Microbia undergo this variation, as a rule, by some kind of starvation. A virulent microbe, which is in the habit of destroying its prey by poison, and digesting it before consuming it, will most certainly, by the laws of natural selection, lose its virulence and digestive power if cultured in a food medium that is already dead, cooked, and digested. In time such a culture of virulent organisms would have, under such conditions, no physiology except osmosis and reproduction. The virulence is a product of natural selection. While the organism continues to kill its prey, the necessity and cause of its acquirement of virulence remains as an active factor of its existence, but if this necessity is done away with the microbe, by atavism, loses its virulence.

Microbia, as I have mentioned, have a physical environment. They also have their personal enemies, which poison them and consume them. They are very like the "old folks at home" in their enmities and their environment. Frost slays many of them. Heat kills others. Fire, and floods, and drugs work their destruction. Climate often brings whole tribes to early death, while natural selection, by letting their natural food supplies get the start of them, captures their base of supplies, and they die because there is a "famine in the land." Kine-pox infection is a variety of the small-pox germ, or, rather, the reverse of this is true, for doubtless the small-pox was originally derived by man from the lower animals, and the microbe reached the human being by having the power, through natural selection, of increasing its virulence. It is definitely known that the climates of mountainous altitudes of six thousand feet very greatly modify, if they do not destroy, the microbe of tubercle, and I have spoken of the fact that telluric influences seem to determine that epidemics of scarlet-fever, diphtheria, measles, etc., shall be malignant or mild.

The latest successful attempt at producing a variation of micro-organisms has been accomplished by Pasteur with the germ of hydrophobia. Pasteur caused a variation of this organism in two directions. He lessened its period of incubation from several weeks to a few days, by inoculating the germ under the *dura mater* of animals. He then lessens the virulence of the germ by drying the spinal cord containing it for certain periods of time, the virulence decreasing every day

for fifteen days. It is enough to say, relating to the variation of microbia, that they are subject to the same laws as are other living things relating to natural selection, and to their methods of getting a living. They are subject to variations by natural causes as they exist in nature and struggle for existence, and any artificial culture that is employed to "attenuate," "modify," "dilute," or "lessen their virulence" is a method which simply follows the laws of nature in natural selection.

From these data it appears that the microbia, in their relations to disease by producing disease, give an immunity from their own action until atavism has time to remove the variation which underlies the immunity; and it appears also that the phenomena of disease, whatever they may be in any given case of sickness, are resultants of the conditions of parasite and host, at any given time, as these conditions have been determined by natural selection.

IMMUNITY FROM DISEASE.

The scope of immunity from disease has several factors and is of wide influence. In the first place, the morphological cells and nuclei are granted an immunity through a variation which enables them to resist the poison of a microbe, and they gain this variation, which is a morphological variation most certainly, only by an actual combat with the poison. No artificial method is known of causing this variation, and very likely none is possible.

The first feature to notice of the many which make up the immunity in general is that in any given disease the character of the disease is very definite, varying in intensity according to the virulence of the germ, but definite as to locality, and duration, and immunity. As we observe, in nearly any given disease certain tissues and organs are involved, while others are not. In small-pox, scarlet-fever, and measles the skin is the chief sufferer, while other organs are comparatively exempt.

Now, there is no other known method of explaining these things except to say that the tissues and organs not diseased, in any given disease, have acquired an immunity through natural selection, while the tissues and organs diseased have

not yet acquired such an immunity; but natural selection is now at work developing the susceptible tissues so that they may acquire a resistance.

It is readily seen, from this standpoint, why disease has such definite points in character and time. If a case of typhoid is diagnosed, the physician is at once able to say how long the fever will last, and what tissues and organs will be diseased; and the reason is that many centuries of time and generations of men, under the laws of natural selection, have secured definiteness in the character of most all diseases.

Adopting this formula, we will apply it to the community and see if it will hold good. In doing so we may look upon the community as an organism that is like an animal organism in relation to the microbe of disease. It is a matter of observation or inference that when an epidemic prevails not all people are attacked or killed. Many, perhaps the larger number, escape. Of course many may possibly not be exposed, but no one can doubt that many are exposed who are not made sick. This action of disease agencies and resistance is analogous to that of the human body. The exempted tissues and organs of the body correspond with the persons and families in the community that are exempt, while the tissues or organs diseased correspond with the families which are made sick.

There is no method of accounting for these things, which are certainly matters of observation, on any other basis of explanation than natural selection. To specialize, for the sake of illustration, it is likely that the germ of small-pox may have been in existence half a million years. It has great powers or resources of variation. Admitting that it is a variety of the kine-pox germ, then the variety was caused by the resources of the parasite in the direction of increasing its virulence. If so, then the struggle between the parasite and the tissues of the human animal has been a long one, and has resulted in giving an immunity to nearly all the tissues of the body except the skin, and the same feature ought to hold good, and probably does hold good, with the certain persons and families of communities.

It is generally supposed that anybody not vaccinated or protected directly will take the small-pox, but probably such is

not true. We must remember that a person may be protected by heredity, or by an attack of the disease—not absolutely, but relatively. A person may not take the small-pox if exposed in the natural way, but if the virus is inoculated one of the barriers of vital resistance may be broken down, and then there is not enough resistance left to prevent the disease.

Other diseases—perhaps consumption and typhoid-fever—furnish better examples of these features. It is a difficult matter to collect reliable data on the subject, but knowing the diffusion of the typhoid microbe, it is indeed something remarkable if the persons who have the disease are the only persons who swallow the typhoid germs. It is far more likely that the greater part of the human family have acquired an immunity from this disease from a long line of typhoid-pestered ancestry. In consumption, a life-long disease in every sense of the word, it may possibly be that the disease itself may be directly inherited, as syphilis certainly may be; but, after all, it is more likely that the *B. tuberculosis* is very widely diffused; that it occupies most of the private houses, and all the public houses and public vehicles. The people who inherit the disease, then, inherit a weak resistance to the disease, and when exposed they take the disease. The family homesteads, where one case of tuberculosis has occurred, are seeded down with the spores of the bacillus. The furniture, carpets, walls, and floors, the drains, and all are depositories of the parasite. If the family are not protected they catch the disease. It is reported that about one seventh of the people who are born die with tuberculosis. These are the people who do not inherit a sufficient resistance to the germ. They are the people who, in relation to consumption, bear the same relation to the community that the skin does to small-pox in the individual. It appears that five sevenths of the persons or families of communities are not susceptible to the action of the germ. They have acquired by heredity or by inheritance an exemption from this disease, and are the analogue, in relation to this disease and the community, of the tissues and organs of the human body which have inherited an immunity from small-pox.

Various theories are afloat relating to the cessation of the great epidemics of the Dark Ages. Modern sanitary writers

endeavor to show sanitary reasons, or that sanitary work brought about the decline of plague, sweating sickness, typhus, scurvy, and small-pox as epidemics. It is certain that these epidemics no longer rage and carry off ten or twenty-five million people at each visitation, and it is also certain that the sanitation which brought about the change was a very thin affair, almost as thin as modern sanitation by political State boards of health. Further than this, it is rather remarkable why it is that a sanitation which can destroy plague, sweating sickness, scurvy, and typhus, will not also prevent the cholera, typhoid, scarlet-fever, measles, and diphtheria.

Undoubtedly the discovery of Jenner has done much to prevent small-pox, but we must remember that vaccination is not sanitation, but is only an imitation or adoption of the old method of gaining an immunity by natural selection which has been in operation ever since the "dawn of life."

Captain Cook learned that fresh vegetables would cure the scurvy. This fact certainly was an aid to the biological force which has practically destroyed this disease. Typhus is said to have been overcome by John Howard, who was the apostle of cleanliness, and went about doing good by cleaning up the prisons of Europe. There is no question but Howard aided the forces of nature by removing the filth of prisons, and prevented the spread of typhus as a jail fever. The great London fire has the credit for destroying the parasite of the sweating sickness and destroying it as an epidemic, while general sanitation and Christianity, I believe, are each claiming the credit of destroying the plague.

These diseases yet exist sporadically. They no longer rise to the dignity of epidemics. The germs yet prosper, but there is too much specific vital resistance in the morphology and physiology of the people to admit of their old-fashioned wholesale onslaughts.

If we are willing to attribute the cessation of these great epidemics to a very little sanitation, it is our duty to congratulate the Middle Ages on an easy job accomplished without boards of health, and with next to no appropriations, and at the same time ask why it is that, with all our boards of health and much money, in our country consumption yearly kills 91,500, scarlet-fever, 16,500, while diphtheria, typhoid,

pneumonia, small-pox and other diseases keep up a yearly mortality large enough to populate a city, and the occasional epidemics of cholera and yellow-fever kill and stampede whole continents?

There was very little European enlightenment, as measured by modern science, until after the cessation of the great epidemics. It is not rational to suppose that sanitation was much of an art until after the scientific enlightenment of Europe. The average duration of life was about eighteen years during the Dark Ages, but after the epidemics were over this index of human success went up to twenty-seven years.

The probability is that natural selection brought Europe out of the Dark Ages, at least so far as the epidemics and the short average of human life were concerned. If there was really any sanitation, of course this factor aided the work.

Applying the law of natural selection to the history, we find that when an epidemic prevailed it destroyed everybody who had not sufficient vital resistance—even if he used his "vital resistance" to run away. Those who could sufficiently resist the disease, or who could acquire a resistance, lived and bequeathed the resistance to their children. In time, by this process, each generation acquired more and more resistance to each of the epidemics, and in time there was nothing left for the parasites of the great European epidemics to do except to acknowledge the survival of the fittest, whose name is Man.

Following out the analogies existing between the diseases of persons and communities, we find a basis of prophecy for the future relating to the old epidemics. We find that man gains an immunity from disease by variation and heredity, but loses it by atavism. We have found that Europe obtained an immunity from the epidemics in the same manner. The prophecy must then be that Europe will, by the influence of atavism, again lose this immunity when, if other things are equal, the country will again be visited by the great epidemics.

Other things will certainly be equal unless practical sanitation shall become independent of politics.

DANGEROUS SOIL MOISTURE IN NEW ORLEANS.—The City Council having adopted an ordinance for so raising street banquettes in certain streets as to increase the accumulation

of stagnant soil moisture under the dwellings, President Fenner, of the Citizens' Auxiliary Sanitary Association, at a meeting of the Executive Committee of that organization, made the following pertinent remarks:

"As sanitarians, we insist that no building is a safe and healthy dwelling-place for human beings the sill and rotting floor of which is sunk beneath the level of adjacent earth. It is a vital necessity that the ground under a dwelling shall be drained to dryness and well ventilated. This condition very fortunately exists, with few exceptions, in the upper portion of the city, but elsewhere the reverse is found.

"To remedy this evil condition, and not to aggravate it, is our earnest desire. It is a difficult problem, we admit, but it must be solved would the people of New Orleans make practical application of preventive measures to secure and maintain good health for their city and its fair repute.

"For seven years this committee has made use of every opportunity to impress the public mind with the absolute importance of a hypsometric survey of this city; such a chart is essential to the adoption of an effective system of drainage.

"You also know that the experience of all time has proven that such important and costly work as the drainage, grading, and paving of any large city should be in the charge of a bureau or Board of Public Works—a body so constituted as to be free as possible from political influences, removals from office, and the damaging and costly consequences of frequent and hasty legislation.

"If the agitation of this banquette ordinance shall tend to prepare the public mind for a radical change, the adoption of a new and compact system, with direct and plainly fixed responsibility, for the old straggling plan which has been enormously costly and productive of no good results, then we say it will have proved a blessing in disguise.

"We have waited long for a betterment of our present defective drainage—let us be patient still. The existing system must of necessity be kept in good order, but not another dollar should be spent in experiments. From data scientifically ascertained the work can be commenced gradually, and it should then be pursued, and its continuance to completion preserved from any intermeddling in any quarter or on any pretence whatever."

HEALTH OF THE U. S. ARMY FOR JANUARY, 1886.

DURING the month of January, in eight military departments, embracing 142 military posts and arsenals and 23 commands operating in the field, from which reports were received, there was a total mean strength of 24,532 officers and enlisted men.

There were admitted to sick report 2625 cases of disease and injury, or 107 per 1000 of mean strength.*

This is a decrease of 30 per 1000 below that for January, 1885, and 35 per 1000 below the average monthly rate for the ten years (ending December 31st, 1884), which was 142 per 1000 of strength.

Twenty-four deaths occurred, as against 15 for the previous month, and 14 for the previous January. This represents an annual mortality from all causes of 11.7 per 1000, or 1.0 per 1000 less than the average for the preceding decade, which was 12.7 per 1000 of mean strength.

The number of discharges for disability was 43,† representing an annual loss to the army from this cause of 21 per 1000 of strength.

The number of troops constantly non-effective from sickness was 954, or 39 per 1000 of strength, being 2 per 1000 above the rate for last month. The rate for the previous January was 47 per 1000, and for the previous decade 44 per 1000 of strength.

The causes of deaths were as follows: Enteric-fever, 1; chronic dysentery, 1; gastritis, 1; pulmonary phthisis, 1; pneumonia, 2; valvular disease of heart, 4; Bright's disease, 1; apoplexy, 1; poisoning by opium, 1; suffocation (by gas), 1; drowning, 2; delirium tremens, 1; shot wounds, 7 (of which number 3 were suicides, 3 homicides, and 1 killed by Mexicans).

* The names and diseases of all officers and enlisted men who are excused from any part of their military duty by reason of disability are required to be entered upon the reports from which these data are drawn.

† Recruits at depots, discharged for disability which existed prior to enlistment, not included.

The causes of admission, and those which have chiefly served to impair the health of the army during the month of January, are shown in Table I.

TABLE I.

Causes of admission in the order of their numerical importance.	Number of cases.	Rate per 1,000 for January, 1886.	Average rate per 1,000 for ten previous Januarys.	Increase or decrease of rate.
First.				
Injuries and accidents	549	22.38	25.17	— 2.79
Contusions and Sprains	226	9.21	14.72	— 5 51
Incised, punctured, lacerated, and contused wounds	105	4.28	3.91	+ .37
Freezing and frostbite	93	3.79	3.84	— .05
Shot wounds	17	.69	.53	+ .16
Fractures (not shot)	8	.33	.62	— .29
All other injuries	100	4.08	1.55	+ 2.53
Second.				
Diseases of the respiratory system	527	21.55	35.19	—13.64
Catarrh	285	11.62	23.40	—11.78
Bronchitis	196	7.99	9.39	— 1.40
Pneumonia	12	.49	.82	— .33
Pulmonary phthisis	10	.47	.28	+ .19
Pleuritis	8	.33	.51	— .18
Other diseases of this class	16	.65	.79	— .14
Third.				
Diseases of the digestive system.	364	14.84	?	?
Tonsillitis, pharyngitis, and sore throat	221	9.01	?	?
Constipation, dyspepsia, and colic	82	3.34	6.86	— 3.52
Other diseases of this class	61	2.49	?	?
Fourth.				
Diseases of the nervous system	145	5.91	9.60	— 3.69
Headache and neuralgia	127	5.18	8.79	— 3.61
Other diseases of this class	18	.73	.81	— .08
Fifth.				
Venereal diseases	141	5.78	7.81	— 2.03
Gonorrhœa	53	2.16	3.89	— 1.73
Syphilis	45	1.83	3.87	— 2.04
Other diseases of this class	43	1.79	.05	+ 1.74
Sixth.				
Diarrhœal diseases	138	5.62	12.14	— 6.52
Diarrhœa	133	5.42	11.04	— 5.62
Dysentery	3	.12	.89	— .77
Cholera-morbus	2	.08	.21	— .13
Seventh.				
Malarial-fever and resulting conditions	104	4.24	9.88	— 5.64
Eighth.				
Rheumatism	103	4.20	11.66	— 7.46
Ninth.				
Enteric-fever	5	.20	.21	— .01
Tenth.				
Typho-malarial fever	0		.09	— .09

The rate of recoveries to the whole number under treatment was 700 per 1000; the rate of deaths, 7 per 1000.

The average duration of treatment among patients who recovered was 10 days, and among those who died 13 days.

Among the more important diseases under treatment during the month of January—those remaining sick from the previous month being included—there were 12 cases of enteric-fever, 5 new cases being reported; 22 cases of pneumonia, 12 of which were new admissions; and 22 cases of pulmonary phthisis, of which 10 were admitted this month. This is a decrease of 3 cases of enteric-fever, and an increase of 6 cases of pneumonia and 9 of pulmonary phthisis from the whole number under treatment in December.

The ratio of mortality from enteric fever to cases treated was 8.3 per cent; from pneumonia, 9.1; and from pulmonary phthisis, 4.5 per cent.

Of contagious and infectious diseases there were 11 cases of erysipelas, 1 of small-pox, 1 of varioloid, 1 of diphtheria, 1 of whooping-cough, all newly admitted.

A comparison of the health of the several military departments may be seen in Table II.

TABLE II.

	Admission rate per 1,000 of mean strength.	Number of troops per 1,000 of mean strength constantly non-effective from sickness.	Average number of days treated among patients who recovered.	Rate per 1,000 of deaths to number of cases treated.
Department of:				
Platte	137	38	7	0
Texas	129	46	9	9
Missouri	120	45	11	7
East	112	40	11	10
Dakota	111	39	11	2
Arizona	82	36	10	13
Columbia	62	29	9	13
California	57	33	13	14
The entire army for the month	107	39	10	7
The entire army for the preceding decade, monthly average	142	44	?	7.5

Thirty-three posts have shown admission rates for the month which were greater than the normal of 142 per 1000 of mean strength, and 109 less.

In the Department of Texas, 31 per cent of the posts gave admission rates above the normal; in the Department of Dakota, 29 per cent; in the Department of Arizona, 26 per cent; in the Departments of the Missouri and the Platte, each 25 per cent; in the Department of the East, 22 per cent; in the Department of Columbia, 12 per cent; and in the Department of California, 8 per cent.

The posts showing the highest rates were: Indianapolis Arsenal, Ind., 385; Fort Meyer, Va., 361; Fort Gibson, Ind. Terr., 337; Fort McKinney, Wyo. Terr., 318; Jefferson Barracks, Mo., 267; Camp Rice, Tex., 254; Fort Wadsworth, N. Y., 239; and Fort Sisseton, Dak., 225.

The lowest admission rates were at San Diego Barracks, Cal., 0; Fort Halleck, Nev., 0; Fort Mason, Cal., 0; Angel Island, Cal., 0; Fort Canby, Wash. Terr., 13; Fort Stockton, Tex., 15; and Fort Elliott, Tex., 19 per 1000 of mean strength.

Forty-seven posts have shown a rate of constant non-effectiveness from sickness above the normal of 44 per 1000 of mean strength, and 95 below.

In the Department of Arizona, 47 per cent of the posts furnished rates of constant non-effectiveness from sickness above the normal. In the Department of Texas, 46 per cent; in the Department of the Missouri, 44 per cent; in the Department of the Platte, 33 per cent; in the Departments of Dakota and of the East, 29 per cent each; in that of California, 17 per cent; and in the Department of Columbia, 12 per cent.

The posts showing the highest constant rates were: San Diego Barracks, Cal., 267; Jefferson Barracks, Mo., 101; Indianapolis Arsenal, Ind., 100; Camp Rice, Tex., 92; Camp Poplar River, Mon. Terr., 89; and Fort Bowie, Ariz. Terr., 84; while the lowest rates were: Fort Halleck, Nev., 0; Fort Mason, Cal., 0; San Carlos, Ariz. Terr., 0; Fort McDowell, Ariz. Terr., 2; Fort Preble, Me., 3; Fort Canby, Wash. Terr., 4; Angel Island, Cal., 7; and Fort Niagara, N. Y., 7 per 1000 of mean strength.

At stations showing high admission rates, catarrh, bronchitis, tonsillitis, and rheumatism, together with injuries, have prevailed.

The causes producing high constant rates were: Pulmonary phthisis, pneumonia, typho-malarial and malarial-fever, venereal diseases, and injuries.

During the month of January, enteric-fever was reported from 9 stations. The cases newly admitted occurred at Soldiers' Hospital, West Point, N. Y., 3 cases; at Fort Wayne, Mich., and Jefferson Barracks, Mo., 1 case each.

Pneumonia existed at 19 stations, as against 16 for December and 9 for November. The cases newly admitted occurred at Fort Leavenworth, Kan., Fort Lewis, Col., Whipple Barracks, Ariz., Fort Concho, Tex., Fort Keogh, Mon. Terr., Willet's Point, N. Y., Jefferson Barracks, Mo., Fort Thomas, Ariz. Terr., Fort Snelling, Minn., Fort Bennett, Dak. Terr., Columbus Barracks, O., and Fort McHenry, Md., 1 case each. Two deaths from this disease were reported—1 at Madison Barracks, N. Y., and 1 at Fort Leavenworth, Kan.

Erysipelas was reported at Fort Laramie, Wyo. Terr., 2 cases; at Fort Stanton, N. M., 2 cases; and 1 case each at the following: Fort Wayne, Mich., Columbus Barracks, O., San Antonio, Tex., Fort Gibson, Ind. Terr., Fort Buford, Dak. Terr., Fort Totten, Dak. Terr., and Fort Sidney, Neb.

Small-pox, 1 case, at Fort Davis, Tex.

Varioloid, 1 case, at Fort McIntosh, Tex.

Diphtheria, 1 case, at Fort Assiniboine, Mon. Terr.

Whooping-cough, 1 case, at Jefferson Barracks, Mo.

The post surgeon at West Point, in his sanitary report dated January 31st, 1886, reports three cases of enteric-fever among men belonging to the cavalry detachment, all quartered in the same barrack and unmarried. He further states: "It is my conviction, however, that these instances of fever are accompanied with a decided malarial element. The premises occupied by this detachment have been carefully inspected, the previous habits of these patients scrutinized, and their food and water supply made a matter of investigation. There is no typhoid-fever in the neighborhood, and all inquiry fails to develop any focus of infection.

"Early in the month these three men were all on guard the

same day during the severest rain-storm of the winter, and they each attribute the first symptoms of illness to the thorough and chilling wetting they received during that tour of duty.

"Under all these circumstances, therefore, I am loath to believe that they are suffering from the true typhoid-fever."

This report also contains the following statement relative to the prevalence of malarial-fever during the years 1884 and 1885:

"There have been few cases, comparatively, of intermittent- and remittent-fevers recently. During the months of September, October, November, and December, 1884, there were taken on sick report 17 cases of intermittent- and remittent-fever, and during the corresponding months of 1885 but 3 cases—all in September and October."

Reports received from 23 commands operating in the field showed an aggregate mean strength of 1873 officers and enlisted men.

One hundred and eight cases, or 58 per 1000 of mean strength, were admitted to sick report during the month, of which number 10 were transferred to permanent stations for treatment, and appear upon their returns.*

Of these admissions 57, or 53 per cent, were for disease, and 51, or 47 per cent, for injuries.

Nineteen commands were operating or *en route* in the Department of Arizona, their strength aggregating 1700 officers and enlisted men, with 79 cases of disease and injury, or 46 per 1000. Two commands in the Department of the Platte, representing a total mean strength of 140, with 28 cases of disease and injury, or 200 per 1000. In the Department of the East, 1 command of 29 officers and enlisted men, with 1 admission to sick report, or 34 per 1000. In the Department of the Missouri, 1 command of 4 officers and enlisted men, and none sick.

The prevalent disorders among troops in the field were bronchitis, tonsillitis, neuralgia, and malarial-fever, together with injuries.

Among troops serving in the field in the Department of

* To avoid duplication, these cases are dropped in the final consolidation for the entire army.

Arizona there were reported 5 cases of gunshot wounds, 4 of which were received in action with Mexicans (1 resulting fatally); two deaths (homicides) by Indian scouts, 1 instantaneous.

Attached to the army, and living at the different military stations, were 5169 women and 6242 children, the wives, children, and servants of the officers and enlisted men.

Among the women there were reported 394 cases of sickness during the month, or 76 per 1000 living. There were no deaths reported. Among the children 379, or 61 per 1000, were taken sick. Five deaths occurred (all under five years of age), representing an annual death rate, at all ages, of 9.6 per 1000 living.

The causes of deaths were reported as follows: Pneumonia, 1; laryngitis, acute, 1; peritonitis, 1; asthenia, 1; and constitutional syphilis, 1. Whooping-cough was reported among the children at Jefferson Barracks, Mo., 5 cases, and at Fort Niobrara, Neb., 4 cases. This disease was also reported at Vancouver Barracks, Wash. Terr., and at Fort Snelling, Minn. Diphtheria, 3 cases, at Benicia Barracks and Arsenal, Cal. Mumps at Helena, Mon. Terr., 4 cases, and at Fort Porter, N. Y., 2 cases. The prevalent diseases among this class were catarrh, bronchitis, tonsillitis, and malarial disorders.

WATER-PROOF CLOTHING.—Besides the use of caoutchouc in the woof or upon the surface of fabrics to render them water-proof, they may be rendered well nigh, if not indeed equally impervious to water—with the special advantage over caoutchouc by continuing to admit air—by first dipping the cloth into and thoroughly saturating it with a solution of soap, after which dip it into a solution of alum, and dry. The process is not impaired by ironing. Another means is, first dip the cloth in a solution of gelatine or isinglass, and afterward in a solution tanin or galls, dry and iron.

There are several other means for water-proofing clothing—by the use of wax, paraffine, glue, turpentine, oil, varnish, etc., and the salts of zinc and lead, in various proportions with one another; but those above given are believed to be equally efficacious, and least likely to affect the color or texture of the cloth.

MORE ABOUT THE YELLOW-FEVER COMMISSION.

THE SANITARIAN holds independent expression of opinion to be among the most important obligations to its readers. Unfortunately, this cannot always be exercised without giving offence. Occasionally, as in the case now before us, subjects of common interest require elucidation which it is difficult to give with sufficient discrimination to avoid the charge of partial judgment between the persons therewith connected and the things signified. Notwithstanding, the risk must be taken. Editors, who are supposably familiar with the issues of their purview, cannot with justice to their readers shirk the responsibility of expressing their opinions; to do so is to forfeit the respect which it is their ambition to maintain.

Early in February last, soon after Dr. Joseph Holt returned to New Orleans from Washington, where he had been to urge upon Congress the commission for the investigation of Freire's and Carmona's experiments, of which he had first obtained the indorsement of the American Public Health Association, we received two enclosures of clippings from the New Orleans *Picayune* showing a sharp controversy between Dr. Holt and Dr. Stanford E. Chaillé. One of these was in an envelope lettered "Office Board of Health, New Orleans, La.," without any accompanying communication; the other one in an envelope with a letter from Dr. Chaillé, requesting the republication of his letter to the *Picayune*, or at least a considerable portion of it in THE SANITARIAN.

We regretfully read this controversy between two highly esteemed friends, and came to the conclusion that our friendship could be best shown by not extending its publicity, though we were much interested in the subject of it.

Knowing Dr. Irving A. Watson, Secretary of the American Public Health Association, to be thoroughly familiar with the merits of the question which had been introduced by Dr. Holt, and that he was in correspondence with Dr. Freire, we requested of him such an account of Freire's and Carmona's inoculations as would be of interest to sanitarians, and with

special reference to the proposed commission. To this Dr. Watson consented, and his communication was published in our April number last, Vol. XVI., p. 352.

Meanwhile the New Orleans *Medical and Surgical Journal*, with which Dr. Chaillé is identified as an active collaborator, had opposed Dr. Holt's position and effort apparently from the same standpoint as Dr. Chaillé's letter in the *Picayune*, leading us to infer, erroneously, as we have since been informed, that he was also the author of the opposition from that source.

On Dr. Holt's return to New Orleans from Washington the *Picayune* of February 7th reported him to have said, among other things :

" The first opposition of which I had any knowledge was an editorial in the January number of the New Orleans *Medical and Surgical Journal.* Holding the editor of that journal, at that time, in the highest personal esteem as a gentleman thoroughly enthusiastic in the welfare of the people of New Orleans and of the South, I regarded the article merely as a sharp criticism hastily made of my efforts, and injudicious at such a critical time, as it might possibly prove detrimental to a plan which, however defective in any of its parts, looked to the salvation of our people and the rehabilitation of their commerce. I regretted the circumstances for reasons of a public character, but considered it only an imprudence.

" I saw a letter written by the Resident Member of the National Board of Health in New Orleans, wherein was planned the entire business of transferring the appropriation and the commission to the National Board of Health. The local members of the National Board in Washington urged upon me the advisability of this transfer, and among other reasons, stated that ' if the commission were to be appointed, and sent into the tropics without the National Board having control of the affair, it would give a death-blow to the National Board of Health, because, as you know very well, any organization, being a long time out of everybody's mind, and therefore forgotten, people begin to think, after awhile, there is no use for the organization to exist. This coming directly from authority, as did the utterance last summer in the presence of responsible witnesses at the Mississippi Quarantine Station, upon the occasion of the inauguration of the opening of the port by maritime sanitation—coming from the local member of the National Board. . . .

" But for this opposition, unfortunate in the interpretation put upon it abroad—for it has not redounded to the fame of its projectors—this effort to send a commission to search out

and discover, if possible, a preventive against the recurrence of such a calamity as that of 1878, would have been successful from the first."

In the same newspaper, February 13th, was a letter from Dr. Holt, from which the following extracts are made:

NEW ORLEANS, February 12, 1886.

Stanford E. Chaillé, M.D., Resident Member National Board of Health.

DEAR SIR: I am in receipt of your letter, dated February 8th, in which you convey the opinion that in the newspaper report of an interview published in the New Orleans daily papers, last Sunday, I have done you injustice in two instances. . . .

I have just received another note, in which you insist upon a reply. In your first letter you say: "I believe that any reader of yesterday's newspaper report of an interview with you would conclude that the resident member of the National Board of Health has been engaged in secretly conspiring against your Yellow-Fever Commission, and instigating and designing plans to thwart it." You declare that you ought not to be exposed to any such inference, inasmuch as I know that your letter was shown me by your special request, and that the action advocated in this letter was prompted by the "plan suggested in a *confidential* enclosure from an influential political friend."

You emphasized this information by the frequent repetition of the words "You know." I certainly do know that while in Washington, attending to my official duties by orders of the Louisiana State Board of Health, and duly commissioned by the American Public Health Association, and Boards of Health of the United States, to perform a certain work embodied in a petition to Congress, and while in the room of Senate committee, and about to address that body, your letter, together with a "confidential enclosure from an influential political friend," was put into my hand, and a whispered but urgent suggestion made to have the whole matter of the Yellow-Fever Commission turned over to the National Board of Health according to a simple plan as I would find set forth in these letters. . . .

In your letter you freely stated what orders you would give the commission.

It was difficult for me to reconcile your letter, indicating your readiness to assume command, with the fact that from the first agitation of this question you had repeatedly expressed disapproval of sending out an investigating commission, on the ground of its uselessness.

Opposed to it at first, the sudden interest of the National

Board of Health was certainly coincident with the widespread manifestation of popular favor *and that forty thousand dollars in sight*. . . .

You, as the Resident Member of the National Board of Health, present on a formal occasion by official invitation, said : " After all that may be said or done, when we consider that in the history of this country New Orleans has been so repeatedly the gateway through which pestilences have found their entrance, I am very strongly of the opinion—indeed, my mind is very clearly convinced—that the only thing to be done is to shut up this port by non-intercourse with all yellow-fever regions for a period of four or five months each year." . . .

Every attempt to help ourselves seems to be the wrong thing to do. In the very moment of our effort to open the port in order to restore prosperity and give steady employment to our needy citizens, the National Board of Health has declared its opinion of its utter inadequacy. And again, when we have proposed to send out and search for a preventive which may grant immunity from yellow-fever, in the line of the great discoveries of Jenner and Pasteur, its resident member has repeatedly thrown a damper by expressing his opinion of the uselessness of even making that effort.

I am fully impressed with the fact that time might prove the inadequacy of all measures to protect New Orleans and the South from the ravages of yellow-fever, and that your prediction may thus be verified, but this does not relieve any citizen of the higher duty of exhausting every effort in the public defence.

Such an unfortunate failure could only redound to the doubtful glory of the National Board of Health in the comfortable and self-complacent expression, " I TOLD YOU SO ! !"

Please remember that, on account of a more intimate acquaintance with its ideas and disposition, I am forevermore an implacable enemy of the National Board.

To these communications of Dr. Holt the *Picayune* of February 21st, 1886, contained a rejoinder of two and a half columns' length, headed, " Dr. Chaillé to the Public," with his name at the end, from which the following portion, which was particularly scored, is taken :

" . . . Respecting the recently advocated bill for a yellow-fever commission, it is charged that I have ' repeatedly expressed disapproval of sending out an investigating commission on the ground of its uselessness.' The facts are that, from 1878 to the present day, I have maintained that competent experts should be continuously employed by the United States in places where yellow-fever continuously prevails, in order to

promote our knowledge of this disease and of its prevention. When I, as President of the Havana Yellow-Fever Commission of the National Board, returned from Cuba in October, 1879, I urged a continuance of the work, which my commission could no longer prosecute, and I also urged preparation for better work by forthwith sending over to the laboratories of Pasteur and of Koch (as ought still to be done) young *acclimated* experts for thorough training. Thus, during all the six years prior to the recent popular advocacy of a commission, I have been advocating the end sought through it. Although I think that some method of inoculation to protect man from scarlet-fever and measles is likely to be discovered prior to such discovery for yellow-fever, I have, nevertheless, recently said and written officially that I deemed researches into yellow-fever so important that I, personally, would prefer to see these researches prosecuted outside of the National Board rather than not at all.

"None the less, *I have* 'repeatedly expressed disapproval of sending out an investigation commission, on the ground of its uselessness,' *if limited*, as was first proposed, to the investigation *solely* of the claims of Freire and of Carmona, because I have no more faith in their claims than I have in the thousands of successful inoculations claimed to have been made for yellow-fever by a Dr. Humboldt from 1847 to 1857, and by Drs. Masnata and Fraschieri in 1864; and for cholera, by Dr. Ferran in 1885. Thus far in my study of the subject I have found no evidence which would justify an expenditure of the public money in investigating the claims of Freire and Carmona, except incidentally as a very small part of a very great work.

"Once more, respecting the Congressional bill to organize the proposed commission, it is charged that, on February 13th the President of our State Board was 'unwarrantably interfered with' by myself and the National Board, and that this 'inimical body' 'thrust itself into the affairs of others [the advocates of this bill] by the *greatest intrusion;*' and, on February 7th, the National Board was denounced for its 'assumptions' and its 'cool audacity.' There are some facts known to me which render it impossible that I should ever have conceived of this view of the matter had it not been forced upon me by the President of our State Board, and I now solicit to these facts the earnest attention of dispassionate readers.

"Prompted for years by a few leading sanitarians, then stimulated by the disastrous epidemic of 1878, the people of these United States, and especially those of this section, did, in the fulness of their wisdom and in Congress assembled, give birth, March 3d, 1879, to an exceedingly feeble sanitary infant,

which was baptized by the name of 'The National Board of Health.' The law, which all good citizens, including State officers, are supposed to respect and obey, invested this infant with some responsibilities, specifying these in the following words: 'The duties of the National Board of Health shall be to *obtain information upon all matters affecting the public health*,' and the members of this board 'shall make or *cause to be made such special examinations and investigations*, at any place or places within the United States, or *at foreign ports*, as *they may deem best*, to aid in the execution of this act and the promotion of its objects'—and these objects are declared to be 'to prevent the introduction of infectious or contagious diseases into the United States.'

"My colleagues and I have been selected by the President and the Senate of the United States because of our supposed special fitness to execute this law, and we have taken oath faithfully to serve it. Is it possible for any man to doubt that, when a new law and agency were proposed, it was the plain duty of those who were sworn faithfully to serve the existing law to urge on Congressmen respect for the act already recorded on their statutes, and to remind them that this act assigned to the members of the National Board the duty of *causing to be made such special examinations and investigations at foreign ports as they might deem best?* and that the law did not require the Louisiana State Board or any other organizations, however numerous and estimable, to discharge this duty at all, and certainly not *as they might deem best?* Having stated these facts, I now leave the reader to determine who has been guilty of 'assumptions,' 'cool audacity,' 'unwarrantable interference,' and the 'greatest intrusion.' If the faithful discharge of my oath of office and of my duty, as I see it and as others may see it, prompts these to justify the above denunciations, then my condition as to these others is hopeless, for the day of *my* repentance and apology will never come. . . .

"Among other misapprehensions is the attributing to the National Board my alleged misdeeds. I protest that *I am not the National Board*, but only one eleventh part of it when it is in session, which it has not been for more than a year. As far as known to me, not even its Executive Committee has taken any action on any of the matters in controversy. Whatever has been done by me has been done solely on my own individual responsibility; hence I decline to subscribe my official title, and I assume every responsibility attachable to me in virtue of those rights, which three of my four great-grandfathers fought to bequeath to me as to every American citizen. I have done nothing as a Federal officer which I would not have done as a private citizen, and all that I have

said, written, or done as to my public duties is open to public inspection."

The above is but a small portion of Dr. Chaillé's letter, but enough to show why THE SANITARIAN, in the same number as Dr. Watson's paper, contained an editorial on the subject, in part as follows :

"Until the recent controversy between himself and Dr. Chaillé, Resident Member of the National Board of Health in New Orleans, in regard to the Yellow-Fever Investigation Commission, Dr. Holt has kept faith with all sister organizations for the protection of the public health. We believe that he has committed an error in denouncing the National Board of Health, and declaring himself to be ever hereafter its implacable enemy because of Dr. Chaillé's interference with his plans ; but we quite as fully believe that he was abundantly justified in his efforts, wholly independent of the National Board of Health, and that Dr. Chaillé, in behalf of the National Board of Health, was not justified in his interference. Recognizing, as Dr. Holt certainly did, that the National Board of Health had been deprived of the chief purposes for which it was created, in default of needful appropriations by Congress and the assumption of its duties by the Treasury Department, there was no reason for him or any one else to suppose that the National Board of Health, without resources, could carry out the purpose which he conceived and contemplated in asking for a special commission. If it be replied that Congress could as easily appropriate the needful funds for the prosecution of the purpose in view as to create a special commission, admitted ; but Congressional disfavor of the National Board during several years has been such as to render any such reliance very doubtful ; especially so, when it is considered that Congressional favor is now divided by two new bills for bureaus of public health, rehabilitating the National Board, as at present organized, and no health legislation at all. The field is indeed an open one, and although, as it appears, sanitarians may be so divided in their ideas of how best to accomplish the end which they all have in view—the protection of the public health—there is, in our judgment, no more certain means of failure in this common object than by contention among themselves.

"But with the view of showing the importance of Dr. Holt's purpose, and the appreciation of it by the American Public Health Association, to whom it was first submitted, Dr. Irving A. Watson, Secretary of the Association, has, at our request, kindly presented the subject in detail on the preceding pages, to which particular attention is invited."

Under date of May 2d Dr. Chaillé sent us a note taking exceptions to the editorial as above quoted, and urging a retraction. We endeavored to satisfy him, under date of May 5th, by the following reply :

" The unjustifiable interference with the plans of Dr. Holt, to which I referred in the April number of THE SANITARIAN, were, and *are*, I think, so generally known through your criticism and exceptions in the New Orleans *Medical and Surgical Journal* and the newspapers of New Orleans, as to need no further explanation. Dr. Holt, as yourself, also sent me duplicates and clippings enough to have more than filled a dozen pages of THE SANITARIAN, to the exclusion of matter which I deemed of more importance. Indeed, I concluded that I could best show the friendship of THE SANITARIAN, and of myself personally, for both of you, by not aiding in the spread of the controversy. I thought, and still think, as I stated in THE SANITARIAN, you were both wrong in your efforts to obstruct one another. It has, unless Dr. Holt changes his mind, resulted in a rejection of any co-operative work with the National Board in the future. Had you, instead of taking severe exceptions to his effort, offered co-operation and aid by the National Board, you would, I think, have strengthened it, and in no way have detracted from the purposes for which it was created, by creating new and rousing old animosities. My relations to and friendship for the National Board, as your own, are, I am sure, not open to question. . . . I believe that it is, as at present constituted, incomparably preferable to any and all the substitutes which have been urged to supplant it. And because I so believe, I endeavor to avoid everything with any tendency to add to the selfish and ambitious interests of those who are trying to supplant it."

This note, instead of having the desired effect, seems to have increased Dr. Chaillé's dissatisfaction, which we very much regret, as nothing could be further from us than to have given him any just cause of offence. We have now endeavored to present the subject more fully, in order to show the basis of our conclusion. If we have in any respect misrepresented Dr. Chaillé, as he asserts, it has been wholly unintentional, and we regret and retract everything we have written or said which

can with justice be so construed. But if it be offensive to Dr. Chaillé to merely differ with him in opinion, for that we are sorry, but we decline to make retraction.

Having now endeavored to present the subject as fairly as we know how, that Dr. Chaillé may have no cause for further complaint, we cheerfully give place to his own interpretation of the controversy, as represented by the correspondence, and abide the judgment of our readers. A. N. BELL.

NEW ORLEANS, LA., May 9, 1886.

Dr. A. N. Bell, Editor of THE SANITARIAN.

DEAR DOCTOR: I stated, May 2d, that "on p. 361 of your April number, in your editorial on the Yellow-Fever Commission, I am accused of and condemned for *unjustifiable interference with the plans of Dr. Holt*, and I claimed that a specification of my acts of interference was due to me as well as to your readers, whose prejudice you incited against me.

The only sentence, in your reply of May 5th, pertinent to my claim, is as follows: The acts of unjustifiable interference referred to "were and are, I think, so *generally known* through your criticisms and exceptions in the New Orleans *Medical and Surgical Journal* and the newspapers of New Orleans as to need no further explanation." What you here state may be generally *suspected*, but cannot possibly be "generally *known*," because not one word of any kind was either written or suggested by me in the aforesaid or any other publications. Your statement is a misrepresentation having no better foundation than suspicion, and therefore, instead of justifying you in declining "further explanation," it strengthens my claim for the specifications requested.

Your misrepresentation is repeated in a subsequent sentence, as follows: "Had you, instead of taking *severe exceptions* to Dr. Holt's efforts, offered co-operation and aid by the National Board, you would, I think, have strengthened it and in no way have detracted from the purposes for which it was created." I reply that I did *not* take "severe exceptions," and that I did do all in my power to bring about the co-operation and aid you advocate. Hence, I again appeal to you, in simple justice, to abandon vague generalities and to specify my acts of unjustifiable interference, my hostile "criticisms," and my "severe exceptions."

As you have been innocently misled, and have thereby misled others to my detriment, I will state as briefly and impartially as is in my power everything done by me.

To January 17th I had done no more than to state, in conversation with inquiring fellow-citizens, that, while in favor of a commission, I was opposed to limiting its researches to an investigation solely of the claims of Freire and of Carmona.

On January 17th I received from Washington two official letters, one from a member of Congress, and the other from the Secretary of the National Board of Health. My reply to the latter was the beginning and the end of my action in this matter, and in that reply must be found, if anywhere, justification for your accusation. To appreciate my reply I must cite the passages, pertinent to the present subject, written by my correspondents.

The member of Congress, who has long experience and great Parliamentary skill, and in whose wisdom and good-will I have the greatest confidence, wrote as follows: "The Yellow-Fever Commission bill proposed would be *new* legislation, and it would be *almost impossible* to carry it through under the *Rules of the House*, and it *could not* be carried on an appropriation bill, for this is new legislation and increases expenses. On the other hand, a simple appropriation for the National Board of Health would be in accordance with existing law, and might be easily obtained." "I repeat, in conclusion, if you and other members of the National Board of Health could induce Dr. Holt particularly to co-operate with you, it would be very easy to secure an appropriation to enable you to make such examinations as you desire."

The Secretary of the National Board of Health wrote as follows: "As we may be called upon for some expression of opinion in regard to this matter, I write to ask that you will give me, in brief, your views upon the subject;" and reference was then made to the possibility of my being "called to the head of the proposed commission."

Since one letter gave, while the other asked for information and advice, I merely acted on the former and answered only the latter. My action was to write forthwith a most friendly note to Dr. Holt, soliciting an interview, referring to my letter from the member of Congress, and expressing my hope that we "might agree on conjoint efforts calculated to promote the

end desired" by Dr. Holt. My note was returned unopened, with the information that Dr. Holt had left for Washington to be absent indefinitely, and his address was not given to my messenger. Thereupon I answered the letter of the Secretary of the National Board of Health, stating my failure to confer with Dr. Holt, and urging the secretary to interview Dr. Holt at once in my behalf, submitting to him my own letter, as also the letter, which I enclosed, from the member of Congress. My own letter was hastily and briefly written on a few pages of note-paper, and contained only two points. First, I expressed my belief that the advice of the member of Congress deserved most careful consideration, and my anxiety and hopes that the members of the National Board of Health in Washington might be able, in conference with Dr. Holt, to unite upon *some plan* which would secure the harmonious co-operation of all influences favorable to the commission. This was all; I did not suggest any plan, nor did I maintain that the commission must be placed under the control of the National Board. This position was taken by my colleagues in Washington, and all I did was, *after* this position had been taken, to uphold it in my article of February 21st. In the second place, I replied to the suggestion that I might be "called to the head of the proposed commission" by stating that under no circumstances would I accept any such position, but would use all the influence I might have in behalf of Dr. George M. Sternberg, U. S. A., who, in my opinion, was pre-eminently the best man in the United States for said position.

A full statement of my acts, denounced as unjustifiable interference, now ends. If I have suppressed any essential truth or suggested any falsehood it is your duty to expose it, and I solicit you to discharge this duty by once again requesting you to specify, in justice to your readers and myself, the acts of unjustifiable interference you accuse me of, and that you maintain this unjust charge with adequate proofs. Should you fail to make your accusation good, as you must, and should you feel astonished that you have been misled, by misrepresentations begotten by suspicion, to unite with others in condemning me, then your mind will have reached the same condition of astonishment with which mine has been disturbed ever since February 7th and 13th, when Dr. Holt, in the

public press, first denounced the National Board of Health and myself for unjustifiable interference with his plans.

To his attacks I was forced to reply on February 21st in an article published only in the New Orleans *Picayune*, which I enclose, and which contains every word I have ever published or been instrumental in publishing on this subject. To this article, and especially to the comparatively brief portion of it which states my action in the matter, and which I have bracketed, I solicit your special attention. Inasmuch as this article was published *after* the repeated publication of the accusation which you indorse, it cannot be held that this my solitary publication constitutes such an act of interference as is complained of and alleged by you.

Respectfully yours,

STANFORD E. CHAILLÉ.

PREVENTIVE medicine has more to do than to ward off epidemic visitations of great scourges, or to remove the local causes of health impairment due to neglect of municipal regulations. Probably the most important of all the duties of medical men is the consideration of the impairment of health of the growing child by modern educational methods, not only through the defective illumination and ventilation of schoolhouses, but also through the protracted confinement, the exacted night work at home, the injudicious mental strain over new-fangled and complicated systems of teaching grammar and arithmetic, and especially the subjection of natural attitudes and gestures to a rigid mechanical angularity of posture, movement, and expression that makes all study an abhorrent torture to every child of any emotional or sympathetic temperament. The prevention of insanity, also, is a problem which only medical men can hope to solve. The alarming increase of the insane population, requiring the multiplication and extension of expensive asylums, makes it a proper subject of inquiry by those concerned with the public health. The repression of crime, as a result of morbid conditions and of the scarcely less serious consequences of inherited evil tendencies from causes originally controllable, give occasion to profounder thought than when to administer a dose of castor-oil, order an enema, or lance a baby's gums.—A. L. GIHON, *Presidential Address before the American Academy of Medicine.*

THE CLIMATIC TREATMENT OF PHTHISIS.

By HAROLD WILLIAMS, M.D.

DURING the past thirty years a gradual change of opinion has come about among medical men in the prognosis of pulmonary phthisis—a change which is due to the advancement of medical knowledge; *first*, with respect to the diagnosis of the disease, and *second*, with respect to its treatment; the former, since by an earlier recognition we are enabled to make an earlier application of our treatment; the latter, because of the improvement in that treatment.

The treatment thus applied may, for convenience, be divided into the medicinal, general, and local; the hygienic and the climatic; and when recovery results, exactly how much is to be ascribed to medicine *per se*; how much to a careful regulation of the hygiene of the patient; or how much is due to climatic treatment, if the climate cure should happen to have been applied, it is impossible to conclude, though in passing I would say that, in my own opinion, a due regulation of the hygiene of the patient is of more value than all other methods of treatment combined, medicine and climate simply being regarded as useful adjuvants to the hygienic treatment.

These brief preliminary remarks, therefore, bring us to the subject of our paper, "The Climatic Treatment of Phthisis," one of the most perplexing questions in the treatment of disease. It has been considered meteorologically, physiologically, and illogically, clinically, empirically, and sentimentally. It is governed by no fixed laws; it is elucidated by few published clinical observations, and it is complicated by the utmost conflict of testimony and opinion, as any one may speedily convince himself by a few hours' perusal of the testimony in favor of the different health resorts.

In the mass of literature which the reader will then find before him, he will see that stations, possessing all the extremes

of different climates, are alike recommended by their respective advocates; and the conclusion is forced upon the investigator, either that these advocates are prejudiced in their views, or that it must be to some common quality or qualities that all these localities are alike indebted for their vaunted reputations.

I shall not attempt to enumerate these health resorts, for their name is legion; let me simply content myself with saying that I have in my possession a list of one hundred and sixty-eight different island districts and towns, all of which are alike recommended for the treatment of pulmonary phthisis—localities which present every phase of difference in therapeutic climate; and I shall leave it to each one of you to infer the difficulty of deciding the question, "Where shall I send my phthisical patient?" But before we come to an analysis of those different factors which combine together to make up climate, I desire to call your attention to two facts which have hitherto escaped notice in the present context, as directly bearing upon the present question, the idiosyncrasies of certain persons for or against the sea or mountains being disregarded for the present.

The first of these facts is, that with or without treatment, certain cases of phthisis naturally tend to recovery, in proof of which I cite the cicatrized lungs of persons dying from other diseases as found in the autopsy room; also those cases familiar to each one of us in practicè, of recovery from those physical signs which we are accustomed to associate with phthisis—of recovery, too, which often occurs under the most unfavorable circumstances. I, myself, can recall the case of a man with well-marked signs at the apex of one lung following upon copious hæmoptysis, who was completely restored to health while living in one of the most crowded and unhealthful localities in this city; and I am sure I need not remind you of the two cases reported by Dr. E. G. Cutler, in a recent number of the Boston *Medical and Surgical Journal* (March 26th, 1885).

This rule, that certain cases of phthisis tend to recovery, I think may be regarded as an axiom; and the same holds good of its converse, that certain cases of phthisis tend to progressive advancement in spite of all that treatment can accomplish

to the contrary. To express this more plainly, I may say that some cases will inevitably recover, while others will as inevitably die, notwithstanding the treatment which may be applied to them, so that recovery or death in any given case should not be ascribed to climate alone, in disregard of other factors.

The second consideration which I would urge upon you is the importance *per se* of *any* change of climate—a change which is often accompanied by a change of scene, of habits, of exercise, of food, of dress, of thought, of companionship, and of surroundings; such changes are generally pleasurable changes, and "states of pleasure are concomitant with an increase of some or all of the vital functions." In my opinion, much of the gain which is derived from a change of climate is due not so much to the curative properties of that *climate* as may be attributed to the effect of the *change*.

But in spite of these facts, that some cases tend to recovery while others as necessarily tend to decline, and that the mere change of residence is valuable in itself, yet this does not preclude the possibility that a given change of residence may be better than another; that some classes of health resorts may be more efficacious than others, and for other reasons in addition to that change; and it therefore becomes our duty to examine the evidence which is adduced in support of these different groups of health resorts.

In a general way, these health resorts may be divided into four principal divisions: the sea itself, island and sea-board stations, inland stations, and mountain stations; and it may be said that the sea air, by which I mean the air of the sea as experienced upon shipboard, and mountain air as experienced at an elevation of six thousand feet, represent the extremes of therapeutic climate. Between these extremes, the inland stations like Aiken and the Adirondack region, and the island and sea-board stations, like the Bermudas and St. Augustine, lie, each possessing in a degree the peculiarities of the extreme to which it is most closely allied.

Besides the common attributes of sunshine, winds, rains, etc., varying with the different local circumstances of each place, the meteorological peculiarities of these extremes may be summarized as follows:

Sea air differs from the other groups in that it contains :

First. The maximum amount of oxygen and the highest degree of atmospheric pressure.

Second. It contains the maximum amount of aqueous vapor.

Third. It contains the maximum amount of ozone.

Fourth. It contains the minimum of organic impurities.

Fifth. It contains small quantities of saline particles, iodine, and bromine.

Sixth. It presents more regular variations of barometric pressure.

Seventh. It presents the minimum diurnal variations of temperature.

Mountain air, on the contrary, contains :

First. The minimum amount of oxygen and the lowest degree of atmospheric pressure, both diminishing in direct ratio to the height above the sea.

Second. It contains the minimum amount of aqueous vapor.

Third. It contains an excess of ozone.

Fourth. It contains a diminished amount of organic impurities.

Fifth. It presents great and irregular variations of barometric pressure.

Sixth. It presents the maximum diurnal variations of temperature.

Seventh. It is lower in temperature.

Eighth. It is characterized by greater "diathermancy" of the air, since by diminished density and humidity it offers less obstruction to the passage of the sun's rays.

Some of these distinctions are, of course, variable, though nearly enough exact for purposes of comparison, the only inaccuracy being in the local surroundings of the individual stations. For example, if we have a mountain resort in a valley, like Davoz Platz, crowded by consumptives and badly drained, the air of that resort would probably contain much of those organic impurities most to be dreaded. Furthermore, the position of a locality with respect to neighboring heights, soil, direction, and character of winds, latitude, and neighboring bodies of water, must, in a measure, modify some of these general rules.

Now these meteorological differences, although at first sight

appearing of radical physiological importance, are in truth of little value in the treatment of phthisis, so far, at least, as is demonstrated by our present knowledge. On the contrary, it is probably due to qualities common to all groups that all are indebted for their reputations, as a brief review of these considerations will show us.

First, as regards the increased quantity of oxygen at the sea level and the converse diminution at altitudes, it has been shown by Dr. Parkes that so long as the oxygen does not sink below fourteen per cent, as much is absorbed as when it is in its natural proportion*—a fact which would vitiate alike all theories based upon an increase or decrease of the oxygen in the atmosphere, since in none of the climates recommended for the treatment of phthisis does the oxygen sink below fourteen per cent. With regard to the consideration of the difference of barometric pressure, however, more attention must be paid, though, like the variation in the quantity of oxygen, it seems to me of little practical importance. That an immediate change from a low to a high level is often a dangerous experiment for a person suffering from phthisis no one can deny, although I believe that the effects of such changes with respect to therapeutic heights have been greatly exaggerated. But be this as it may, the effects of sudden and extreme changes are not our present consideration. We are speaking now not of sudden deleterious changes, but of permanent favorable changes, slowly accomplished.

As none of the advocates of low levels urge the consideration of increased pressure, I shall confine my attention solely to the effects of diminished pressure, since it is largely upon this meteorological consideration that the advocates of high altitudes base their claims.

The nearest approach to a theory that I have been able to find, as to the effect of diminished pressure upon phthisical patients, is that advanced by Dr. Denison, which I quote as follows :

" With the atmosphere, let us say, one fifth rarefied, respiration is deeper and more frequent. Here the density of the air in the lungs during inspiration would seem to be lessened

* Parkes' Practical Hygiene, 1883. Sixth ed., p. 429.

in proportion to the greater quantity of air which has to be breathed. This increased approach to a state of vacuum in the lungs tends to draw the blood quickly into the pulmonary vessels, which movement of the circulating fluid is aided by the accompanying increased action of the heart."* This increased capillary circulation in the lungs acts, Denison claims, in two distinct ways: first, by being in "opposition to stasis of blood which is an early stage of inflammation," and second, that by the pressure these expanded vessels exert upon the intercellular tissue, they crowd outward the products of inflammation.

Now this theory seems to me untenable both in its data and its conclusions. In the first place, it assumes that respirations are increased in force and frequency at therapeutic altitudes, whereas upon this point there is conflict of testimony, Jourdanet† asserting that respirations are lessened, while Coindet maintains that they are increased, thus showing that the question of increased respiration has still to be settled. But even supposing the respirations are increased both in force and frequency, such increase would seem not to *lessen* the density of the air breathed, thus causing a vacuum in the lungs, but, on the contrary, it would seem rather to *increase* the density of the contained air. For the greater the quantity of air in the lungs, the greater would be the distension of the elastic chest walls, and consequently the greater the pressure exerted upon the air contained, thus increasing its density. So that if we admit that the respirations are increased, this increase should be regarded as the probable factor by which the organism accommodates itself to diminished atmospheric pressure rather than as a means of causing a vacuum, as Dr. Denison claims in support of his theory. Moreover, Dr. Denison claims that this increased pulmonary circulation is also supplemented by increased action of the heart, whereas Jaccoud says that the acceleration of the cardiac pulsation is only temporary, and ceases at the end of a few days.‡ But for purposes of argument, admitting that the air in the lungs *does* approach a state of vacuum, Dr. Denison has yet to show the advantage of this state, even provided that it did increase capillary circulation.

* Rocky Mountain Health Resorts, 1880, p. 92.

† The Alpine Winter Cure, Wise, pp. 27, 28.

‡ Pulmonary Phthisis, Jaccoud, p. 291.

For to say that "stasis of blood is an early stage of inflammation," is but a partial statement of the case, while to claim that the pressure of the dilated vessels upon the intercellular tissue crowds out the products of inflammation is purely conjectural, and a simple statement of what he desires to prove. Without stronger evidence than that afforded by this theory alone in favor of diminished pressure, therefore, it seems to me that we are not justified in sending our patients to the mountains.

Or again, in speaking of the doctrine of immunity from phthisis, which I shall allude to later on. Dr. J. Schraber, in his address before the Vienna Meteorological Society, translated by Dr. Geddings, of Aiken, says that the altitude at which this immunity commenced varied with the latitude, being higher the nearer we approach the equator, a fact which would seem to demolish the theory of diminished pressure alone, as an agent of value in the treatment of phthisis. Moreover, when we consider that artificially increased pressure is a method of treatment at present in vogue (Waldenburg's method), as well as is diminished pressure (high altitudes), it seems to me that we must admit that the effects of pressure upon phthisical patients are by no means clearly understood.

With regard to the effects of a difference in quantity of the aqueous vapor in the atmosphere, the advocates of high altitudes have much to say, while the advocates of the sea say little. Of the former, all assert their belief in the importance of dryness of the air, although none have given sufficient reasons for upholding that belief.

Here it must be understood that we are dealing with the question, "Does an extreme dryness of the air exert a more favorable curative influence upon the phthisical than does extreme moisture?" and not with that greater question of the development of phthisis because of soil-moisture. We must remember that, notwithstanding how great the effect may be that soil-moisture exerts upon the development of phthisis—an effect which is probably due to the fact that the exhalations of damp ground are inconsistent with hygienic perfection, and to its affording a suitable soil for the development of germs—that the question now before us is of the effects of dryness or humidity of the air upon the disease, already established,

upon which subject the physiological evidence is again vague and conflicting.

For example, the statement, "The watery vapor abstracting an undue amount of heat from the respiratiory track and giving rise to catarrhs, coughs, or perhaps inflammation,"* is met by the assertion, "Freedom from colds because of humidity."† Or again the statement, "The natural consequence of this dryness (of the air) is the abstraction of so much water from the respiratory tube that the lungs are *proportionately colder*, the consequence of which may be that some antipyretic effect is produced,"‡ is met by the experiments of Beneka, who has shown that heat is lost more readily at the North Sea than at high altitudes,§ all of which go to show the unsettled state of the medical mind upon the effects of humidity. How the importance of aqueous vapor as a factor in the cure of phthisis should have gained ground I do not know. I can simply say that I know of no evidence proving that importance.

Fourth. With respect to ozone and "its effect upon man, little is known"‖—a fact of considerable importance, when we reflect that patients are daily sent to the Adirondacks, to Aiken, and to the New Jersey and Georgia pines because of the increase of ozone which is said to follow in consequence of the turpentine exhaled from the trees.¶ In this context I would say that those who rely upon this theory repose their faith upon broken reeds, since not only is it claimed by Brown "that ozone is nearly or quite inoperative in the curability of disease, but also since it is known that turpentine has the peculiar property of preventing the further formation of ozone.** In regard to this question of atmospheric electricity, a curious claim has been advanced by Denison, who says :†† "You lie down to sleep on the ground as only a tired camper can, and rise in the morning from your *negative electric* bed, to stretch yourself in the *positive electric* air." As the "positive electric air" is caressing the "tired camper" quite as much while he is sleeping as when he is stretching (unless he should

* Wise, op. cit., p. 20. † Yeo's Health Resorts. ‡ Jaccoud, op. cit., 341.
§ Deutsches archiv. fur klin med., March, 1874.
‖ Tripe. Tr. of the Soc. Med. Off. Health, 1882–83, p. 20.
¶ Practical Medicine, Loomis, p. 204. ** Brown, Tr. Rh. Ist. m. Soc., 1880.
†† Brown, op. cit., also Enc. Brit., vol. xviii., p. 113.

have covered up his head with his blanket), I conclude that it is the stretching which Dr. Denison intends to inform us is of use, though why an invalid need go to Colorado in order to stretch himself in the open air is not so evident.

Fifth. Sea air contains a small quantity of saline particles of iodine and bromide, which, says Yeo, "may not be without real influence on some organisms."*

Sixth. Mountain air presents less regular variations of barometric pressure, and an increased diathermancy. Upon these points of difference nothing is proved; of the former, it is claimed that variations of barometric pressure exert considerable influence on the circulation of the air contained in the soil—the so-called ground air—an air which is likely to be contaminated with carbonic acid, marsh gas, and occasionally sulphuretted hydrogen;† and of the latter, it is claimed by Denison‡ that since mines are unhealthy because of the absence of sunshine, and since the power of the sunshine increases with increasing altitude, therefore "*the beneficial effects of sunshine increase with increasing altitudes.*" Denison's syllogism disregards latitude, and, if true, would go to show that Colorado was less suited for consumptives than all points between it and the equator if of equal altitude, since the altitude being the same, the effects of the sun's rays must be increased as we approach the equator, as is shown by the increasing altitude of the snow-line.

Seventh. The sea air presents the minimum of diurnal variation of temperature, a factor which seems to me greatly in favor of the sea, inasmuch as the important effect upon health of sudden and great changes of temperature by promoting or checking perspiration is generally admitted. Moreover, it must be borne in mind that these changes, however great they may appear with us, are still greater in many of the mountain stations, and less upon the sea itself. The annual range at Fort Sully, for example, is 150° F.,§ whereas in the Eastern or Atlantic States it is 106°. Again, the range at Denver for the month of March, 1880, was 83°,‖ whereas in Santa Barbara the

* Denison, op. cit., p. 75.
† Health Resorts.
‡ Tripe, op. cit.
§ Denison, op. cit., p. 22.
‖ Rattray Phil. Med. Times, 1880–81, xi., p. 358.

maximum variation for the month of January, 1879, was 29° F.,* while again, according to the report of the Challenger the diurnal range of the temperature of the air over the North Atlantic on a mean of one hundred and twenty-six days was 3° 21′,† figures which are taken from the data at hand, simply to show the variations of temperature. And in this context I would say that such tables of temperature as are usually given are of little practical value in the selection of a health resort. It is the *diurnal range* that we wish to know, and in such reports the diurnal range is carefully avoided.

Eighth. Mountain air is lower in temperature, a factor which again seems to me in favor of the sea, since the coldness of the mountains is opposed to the principles of hygiene in so far as it admits of less open air exercise and prevents a suitable ventilation of the houses, the evil effects of which latter are augmented by the herding together of consumptive patients in hot, ill-ventilated rooms during the major portion of the twenty-four hours. I know of no better illustration of this than is afforded by Hassall, who writes: "Few invalids who go to Davoz . . . spend more than four or five hours in the open air. . . . In his rooms he breathes the rarefied air, heated by stoves, rendered impure by the number of persons congregated together in a small space, all breathing the same air."‡

Ninth. Both sea and, to a slightly less degree, mountain air contain the minimum amount of organic impurity; the sea, because there exists no source of origin; the mountains, because of the paucity of population, the lowness of temperature, the presence of snow, and the prevalence of winds.

Thus, then, to sum up the meteorological differences between the air of the mountains and the air of the sea, it would seem that the sea-air possesses certain possible advantages over that of the mountains in that it is warmer and purer, and that it presents slighter variations both of temperature and humidity.§ But this, it must be remembered, is the air over the sea itself—air that can only be prescribed through the

* Fiske, N. Y. M. Record, 1884, xxvi., p. 526.

† Nelson, The Planet, N. Y., 1883–84, p. 135.

‡ Hassall, Lond. Lancet, 1879, ii., p. 152.

§ The Ocean as a Health Resort. Wilson, p. 234.

medium of ocean voyages, a prescription open to the grave objections of idiosyncrasy against the sea, sea-sickness, anxiety at leaving friends, fears of dangers, lack of companionship, variety, and exercise, and, above all, inferiority of food. Added to which is the difficulty of selecting a voyage which shall extend over a sufficiently long period of time. Thus, though it would appear that the sea-air is theoretically somewhat better than other climates for such consumptives as can avail themselves of it, we cannot but recognize, in view of these ulterior considerations, that it is available but for few.

Island and sea-board stations resemble most nearly the sea, differing from it both with respect to variations of temperature and humidity, and purity of the air, the latter being probably dependent upon the density of population, the age of settlement, the character of the soil, and the prevalence and direction of winds. Inland stations, on the other hand, resemble the mountains or the sea according to their altitudes and consequent humidity and diurnal and annual ranges.

Physiologically speaking, therefore, it may be said that mountain air is no better than island or sea-board air because it is colder and more liable to sudden and excessive changes of temperature, while, on the other hand, it may be contended that island or sea-board air is no better than mountain air because of its diminished purity, the factors of difference in each class thus becoming, in a comparison, factors of equalization. And in this context I would allude to the idiosyncrasies of individual patients for or against the sea or mountains. I think there can be no doubt that some people feel better at the sea than at the mountains, or *vice versa*, in the same way that they manifest a different tolerance of drugs ; and I believe that these individual preferences should be consulted in the successful treatment of phthisis by climate, although no definite rule can be laid down with this respect unless it should be that in general people above the middle age do better at the sea.*

Clinically considered, I again find the evidence vague and incomplete. I am aware of but three statistical reports of any value in favor of the high altitude treatment : those of

* Loomis, op. cit., p. 205.

Spengler,* concerning cases at Davoz Platz, 5100 feet above the sea; those of Denison,† of cases occurring in Colorado, Wyoming, and New Mexico, and those of Charles K. Williams,‡ also of cases at Davoz. Of the island, seaboard, and inland resorts I can find no statistical report whatever of completeness. From the reports of mountain treatment no conclusion can be drawn.

In Spengler's statistics of 323 cases, 73 recovered, or about one fourth, as compared with the one sixth of recoveries cited by Loomis§ as the result of mixed treament. Yet we are informed by Charles K. Williams that among the patients at Davoz "there is a limited amount of disease (and that too in an incipent form)."‖ From this it would appear that a large number of Spengler's cases were of incipient phthisis, or selected cases, and from such material it is evident that no conclusion can fairly be deduced. One hundred and ninety of the 323 are claimed to have been improved, but temporary improvement belongs to the natural history of phthisis, as is well known to every practitioner of medicine. Above all, Spengler's observations were made during one and a half years, a period of time far too short to enable us to arrive at valid conclusions. Denison's statistics consist of 260 records, 58 of which are excluded, 34 for reasons which seems to me insufficient. Of the 202 remaining cases, the observations extended only over an average period of one and three fourth years, thus representing "an analysis of 50 years, spent by 202 consumptives in Colorado," as Denison more attractively puts it. But actual results are not given. Dr. Denison merely speaks of improvement, and temporary improvement, as I have said, belongs to the natural history of the disease. Moreover, improvement is often exaggerated, especially when recorded by so enthusiastic a partisan as Dr. Denison. Williams's statistics present similar objections. The illogical argument in favor of certain localities may be briefly stated as follows: In the locality A phthisis is unknown, therefore the locality A offers the greatest hope of recovery for persons suffering from phthisis. Such an argument is of course absurd, especially in

* Peters, Edinb. no. p., 1880–81, xxvi., p. 1100.

† Denison, op. cit.

‡ London Lancet, 1879, ii., 191–233.

§ Loomis, op. cit., p. 197.

‖ Williams, Lond. Lancet, op. cit.

view of the present light thrown upon the cause of the disease by Koch in his renowned discovery. We do not argue that because typhoid-fever is unknown in a certain town, that town is especially adapted for the treatment of cases of typhoid, and should we so argue, I think it would be safe to infer that this town would not enjoy its reputation for any considerable period of time. Moreover, to say that it is because of the climate alone that the inhabitants of a certain Swiss hamlet enjoy their immunity from phthisis, is illogical in the extreme. Who can say that such immunity is not due to the rugged habits of the mountaineers? to their hygienic active open-air lives? Or how are we to reconcile such a doctrine with the statement of Parkes,* that in the Swiss Alps, while phthisis is rare among the men, who live in the open air, yet it is very prevalent among the women, who, "employed in making embroidery, congregate all day in small, ill-ventilated low rooms"? I, for my part, have no more doubt that it is the open-air life and not the climate that has granted this immunity to the men than I have that it is the sedentary occupation and impure air *and not the climate* which has proved so destructive to the women. Moreover, upon this subject of immunity the greatest contradiction of statement prevails. For example, the statement, "The exceeding fatality of consumption," etc.,† in Florida, is answered by the counter assertion that Florida at the time of writing had no "State Board of Health and no registration of deaths outside of the city of Jacksonville,"‡ showing that any statement in regard to the prevalence of consumption in Florida, at that time, must have been purely conjectural; and again, "The investigations of Hirsch have shown that neither the geographical position nor the temperature have anything to do with the prevalence of consumption, . . . which is very common . . . in Siberia,"§ while on the fifty-ninth page of Denison's book we find on the contrary the assertion: "In Siberia phthisis is very rare."‖

Another form of the illogical argument at present in vogue is that A. recovered in —ton, therefore we should send B. to —ton. Yet this argument might be as correctly stated by

* Practical Hygiene, p. 429. † Talbot Jones, N. Y. Med. Jl., Sept., 1879.
‡ C. F. Kenworthy, N. Y. M. J., Oct. and Nov., 1880.
§ Ziemssen's Archiv., vol. v., p. 490. ‖ Denison, op. cit., p. 59.

saying "C. died in —ton, therefore we should *not* send B. to —ton."

The sentimental aspect of the question demands but little notice at our hands. It is hardly necessary for me to call the attention of members of this society to the physiological effects of the perfumed zephyrs or the health-giving breezes which figure so largely in the descriptions of health resorts found in our medical journals. I have simply alluded to the subject in order to remind you that sentiment is not science, and consequently should be shunned while dealing with questions of scientific importance.

Thus, then, to sum up, it seems to me we must admit that at the present state of our knowledge the meteorological differences of climate have been proved to be of little importance in the treatment of phthisis; and furthermore, it seems to me that clinical evidence would support this conclusion; for the burden of proof lies with those advocates who plead in favor of special climates, and such proof, it seems to me, is yet to be forthcoming.

But the beneficial effects of a change of climate in the treatment of phthisis is a matter of common belief if not of statistical proof, and such beneficial effects I believe to be due to factors common to all groups of health resorts, varying only in degree. These factors are: the change itself; the purity of the air;* the increased number of hours of open-air exercise permitted;† and the improved hygienic surroundings of the patient; and this belief I shall hold until better evidence is adduced in favor of any of the four groups of health resorts. But before closing, I would say that if these three groups of health stations (sea voyages, the best, being now disregarded) are admitted to be similar, yet individually these places are not to be regarded as equal, the superiority which one exercises over another being that it affords greater hygienic advantages.

An ideal health resort for this disease should be sparsely and newly settled.‡ It should possess a pure water-supply and adequate drainage. It should be of a dry and porous soil, and

* Fayrer, Med. Soc. Lond. Lond. Lancet, 1883, i., 595. † Parkes, op. cit.

‡ And it is with density of population that phthisis has become endemic. Bancroft, Am. Med. Bi-weekly, Jan. 4th, 1879.

should be favorably situated with respect to neighboring heights and marshes and prevailing winds. It should be equable in temperature, and should possess the maximum of pleasant weather. It should not be so hot as to be enervating, nor so cold as to prevent out-door exercise and proper ventilation of the houses. It should afford plenty of amusement; it should not be crowded with consumptives, and it should be sufficiently unfashionable as to admit of hygienic dress.

Above all, it should afford suitable accommodations for the invalid. The house should be carefully situated and thoroughly ventilated; the food should be abundant, palatable, and varied; and the sleeping-room should be large and sunny, and afford sufficient ventilation; and I believe that such a health resort as affords these advantages in the highest degree will be found by experience to be the best locality for a phthisical patient, be the barometric pressure, the aqueous vapor, and "the diathermancy" what they may.

In conclusion, I would say that the views arrived at in the present paper are by no means new, although they have not to my knowledge been similarly stated. For example, Parkes, in his "Practical Hygiene," has said: "The best climates for phthisis are those which permit the greatest number of hours to be passed out of the house;"* and again, Sir Joseph Fayrer, President of the London Medical Society, expressed a similar opinion, when he said that: "Too much importance had been attached to altitude; it was pure air that is of most value."† For myself, I believe that more attention has been paid to the meteorological differences of climate than their efficacy has been shown to deserve, and that, too, to the great detriment of such patients as are unable to avail themselves of them, since, as they cannot be sent to such places as their physicians regard most valuable, they are not sent away at all. To such persons I believe that a consideration of what I have said must prove of real value. Some change of climate is possible for all; even the artisan or the laborer can pursue his calling in the country as well as in the city, or upon the sea-board as well as in the interior.—*Boston Medical and Surgical Journal, October 1st*, 1885.

* Parkes' Practical Hygiene, quoted in B. M. & S. J., 1883, xviii., 282.

† Med. Soc. Lond. Lond. Lancet, 1883, i. 595.

THE AMERICAN MEDICAL ASSOCIATION.

The thirty-seventh annual meeting of this Association, held in St. Louis May 4th to 7th, was characterized by large attendance, harmonious action and good works, in a great measure due to the excellent arrangements made by the local committee and the skill of active workers who have the good of the Association at heart.

The Association assembled in the Exposition Building at 11 A.M., May 4th, and was called to order by Dr. Le Grand Atwood, Chairman of the Committee of Arrangements. Prayer was offered by Rev. Dr. M. Schuyler. Dr. Atwood introduced Honorable D. R. Francis, Mayor of the city, who delivered an address of welcome in behalf of the citizens; and following him, Dr. Atwood delivered an address of welcome in behalf of the medical profession of St. Louis.

The programme and other appointments for the session were read and approved, "Members by Invitation" elected, and some protests read against contending delegates. Dr. S. Logan, Vice-President, then took the chair, and the President, Dr. William Brodie, of Detroit, delivered the Annual Address. He dwelt in particular upon the uniformity with which the cardinal precepts of the Association had been upheld by all those who participated in its formation forty years ago, with the single exception of the Medical Society of the State of New York, and the progress of the profession under the auspices of the organization. He announced with pleasure that the arrangements for the Ninth International Medical Congress, to be held in Washington next year, were progressing favorably, and the prospect for a successful Congress auspicious.

On the conclusion of the President's address Dr. J. S. Lynch, of Baltimore, read the report of the Committee on the International Medical Congress, and submitted a list of the members of the organization, which was unanimously accepted and adopted. (Will publish list hereafter.)

The second day's proceedings opened with the usual routine work of the appointments and reports of committees. The by-laws were amended, creating a Section on Medical Jurisprudence. Next followed the address of Dr. Nicholas Senn, Chairman of the Section on Surgery, on the "Present Status of Abdominal Surgery," and after this the address by Dr. S. C. Gordon, Chairman of the Section on Obstetrics.

The third day's first business was the report of the nominating committee, and the election of officers for the ensuing year, as follows:

President: E. H. Gregory, St. Louis; *First Vice-President:* B. H. Miller, Stillwater, Minnesota; *Second Vice-President:* W. B. Welch, Arkansas; *Third Vice-President:* W. H. Pancoast, Philadelphia; *Fourth Vice-President:* W. C. Wile, Connecticut; *Permanent Secretary:* W. B. Atkinson, Philadelphia; *Assistant Secretary:* J. Nevins Hyde, Chicago; *Treasurer:* Richard Dunglison, Philadelphia; *Librarian:* C. H. A. Kleinschmidt, Washington.

Next place of meeting, Chicago, Ill., first Tuesday in June, 1887.

Officers of the Sections:

Practice of Medicine: Chairman, J. S. Lynch; Secretary, J. B. Mervin; *Obstetrics and Diseases of Women:* Chairman, F. M. Johnson, Kansas City; Secretary, W. W. Jaggard, Chicago; *Surgery and Anatomy:* Chairman, H. H. Mudd, of St. Louis; Secretary, John P. Roberts, of Philadelphia; *Opthalmology, Otology and Laryngology:* Chairman, F. X. Scott; Secretary, J. H. Thompson; *Diseases of Children:* Chairman, DeLaskie Miller, Chicago; Secretary, W. B. Lawrence, Batesville, Ark.; *Oral and Dental Surgery:* Chairman, J. S. Marshall, Chicago; Secretary, E. S. Talbot, Chicago; *State Medicine:* Chairman, G. H. Rohé, Baltimore; Secretary, W. Wyman, U.S.M.H.S.; *Medical Jurisprudence:* Chairman, J. N. Quimby, N. J.; Secretary, H. H. Kimball, Minn.

Reports of Committees on the President's address, Meteorological Conditions and their Relations to Diseases, Collective Investigation of Disease and Cremation, were submitted and referred. Then followed the address by Dr. James T. Whittaker, Chairman of the Section on Practical Medicine, Materia Medica and Physiology; and next the address of Dr. John H.

Rauch, Chairman of the Section on State Medicine. (Dr. Rauch's address will be published hereafter.)

Entertainment of the International Medical Congress.

On motion of Dr. A. Y. P. Garnett, seconded by Dr. D. W. Yandell, it was

Resolved, That the delegates to this Association be requested upon their return to their homes to adopt such means as may to them seem best to call the attention of their respective delegates to the Congress of the United States to the desirability of making an appropriation to assist the medical profession of this country in properly receiving and entertaining the International Medical Congress in Washington in 1887.

Yellow-Fever Prevention.

On the morning of the fourth day, the Permanent Secretary read the following on behalf of J. McF. Gaston, of Atlanta, Ga.:

Whereas, Authentic reports have been published, indicating that inoculation with the attenuated virus of yellow-fever has afforded protection from this disease in more than 6000 persons, residing in the same localities with others not inoculated who died during an epidemic of yellow-fever in Rio de Janeiro, Brazil, and

Whereas, Other evidence of the efficacy of yellow-fever inoculation is corroborated by the statements of Dr. Horace M. Lane, a member of this Association now present, to the effect that he was inoculated by Dr. Domingos Freire in Rio de Janeiro and remained in that city without contracting the disease, while many others who were not thus inoculated were attacked and died; and further, that he had the opportunity of verifying the protective influence of inoculation against yellow-fever in numerous other cases under his observation, and

Whereas, The facts in regard to the results of this prophylactic against yellow-fever warrant the conviction that it is trustworthy and safe in practice, therefore

Resolved, That the American Medical Association recommends prompt action by the United States Government for the investigation of the claims of inoculation against yellow-fever; and the appropriation of the means requisite for the expenses of the same, with the appointment of a medical and scientific commission to undertake this inquiry.

Resolved, That a committee of three be appointed by the President to memorialize Congress in accordance with this recommendation at the earliest day practicable.

The President announced the following as the committee: Drs. J. McF. Gaston, of Atlanta, Ga.; P. O. Hooper, of Little Rock, Ark.; and T. G. Richardson, of New Orleans, La.

Next the reports of the Treasurer, Trustees of the Journal and Judicial Council; and after this the addresses on "Opthalmology, Otology and Laryngology," by Dr. Eugene Smith, Chairman of the Section; "Diseases of Children," by Dr. W. D. Haggard, Chairman of the Section; and "Oral and Dental Surgery," by Dr. John S. Marshall, Chairman of the Section.

Hygiene in the Public Schools.

The following resolution offered by Dr. John Morris, of Baltimore, was adopted:

Resolved, That we reaffirm the utterances of the American Medical Association concerning the use and abuse of alcohol and its effects upon the body, and recommend the study of hygiene in all our public schools. To facilitate this study, we urge the speedy passage by the House of Representatives of the Senate bill now before it, requiring instruction in the effects of stimulants and narcotics in schools under Federal control.

Resolutions approving the report of the Committee on Cremation were adopted, but finally the whole subject was referred to the Section on State Medicine for report at the next session.

After the appointment of various committees, delegates to foreign Societies, reference of reports and papers to appropriate committees, and resolutions of thanks to the medical profession and citizens of St. Louis, the Association adjourned.

The afternoons were, as usual, devoted to the division of labor in the several sections; that on State Medicine especially, and the address of the chairman, we purpose a special report upon hereafter.

With reference to some of the citizens of St. Louis who, besides the Committee of Arrangements and the physicians generally, exerted themselves to make this meeting of the Association so eminently successful and worthy of the good repute of St. Louis for such entertainments, the *Weekly Medical Review* of May 15th makes the following comments:

"We think that the medical profession of St. Louis owes a debt of gratitude to Mr. J. W. Lambert, Chairman of the Citizens' Auxiliary Committee. Up to within a few weeks of the convention uncertainty and doubt reigned supreme; but under the skilful management of Mr. Lambert everything was soon in good running shape for work.

"His excellent tact, taste, and executive ability were everywhere apparent in the planning of the various entertainments and the carrying out of the same. But the mid-week feature, the reception and ball at the Merchants' Exchange, and the grand closing climax, the steamboat excursion on Friday, was essentially Lambertian in its every detail and the result obtained.

"It seems peculiarly appropriate that the man who has so thoroughly identified himself with the members of our profession in a pharmaceutical way should have been the one selected to carry off the honors."

We are gratified to learn that the Entertainment Committee has also signified its high appreciation of Mr. Lambert's services by presenting him one of the finest of Jurgensen's repeaters. In the published account of the presentation ceremony it is stated the recipient first organized the Citizens' Committee and personally secured most of the money raised by that committee. In one day he obtained more than half the amount that was raised altogether. He alone attended to all the arrangements for the magnificent reception which was tendered the physicians, and he carried them to perfection unaided.

STARVATIONISTS.—A community was started at Anaheim several years ago, the principal feature of which was that only uncooked vegetable food was used. One after another of the members has left, either by resignation or starvation, and now but two are left. One of these, the spiritual adviser of the society, Walter Lockwood Thales, is so nearly starved to death that he is confined to his bed from weakness, and the other, Mrs. Hinde, is so near the bound of life that the ladies living near her are forbidden to see her pale, wan face in the dying pangs of death by starvation.—*San Francisco Chronicle.*

THE INTRODUCTION OF DANGEROUS DISEASES.

TO THE EDITOR OF THE SANITARIAN: In the June number of THE SANITARIAN you give the action of the New York Chamber of Commerce, June 2d, 1886, in regard to the subject of disinfecting imported rags. The resolution declares "that invoices of rags accompanied by a certificate of the United States consul that they were all gathered in a country which at that time was, and for at least six months immediately preceding had been, free from cholera or other contagious or infectious epidemic diseases, should not be required to be disinfected either before shipment or on arrival."

If the consuls acted on official information, probably such a certificate as is proposed by the Chamber of Commerce could never be given. There is not a country, at least not a large country, in Europe that is free of small-pox, to say nothing of more dangerous diseases, during any three consecutive months of the year. The large cities—London, Paris, Madrid, Rome, Vienna, etc.—have that disease nearly all the time. The Michigan State Board of Health receives weekly or monthly statements of sickness and deaths from the principal countries of Europe. They are not well arranged for convenient study; but, selecting at random the cities of Rome and Copenhagen, most of the mortality reports for 1885 from those places were examined, and it was found that small-pox occurred in Rome in every month of the year, and in Copenhagen at least ten months. From the annual reports of the health officer of Liverpool, 1884, I learn that small-pox was present in that city every month of the two years 1883 and 1884. The same can be said of the province and city of Madrid, and other provinces in Spain for 1884. You published, June, 1886 (page 567), a statement showing that small-pox was present in seventeen of the large cities of Europe in January, February, and March, 1886, and they represent England, Scotland, France, Germany, Austria, Hungary, Russia, Belgium, and Poland. From reports received at this office I can add to that list Italy, Denmark, and Spain, and if I were to make a thorough examination of them, I probably could add others.

But small-pox is not the disease most to be dreaded by our people ; and, judging by past experience, cholera is of small consequence compared with those diseases which, when once introduced, tend more strongly than do those diseases to remain, and continue to swell the death-rates. In the year 1880 small-pox is reported to have killed only 871 people in the United States, while scarlet-fever killed 16,416, and diphtheria killed 38,398.

In Michigan, in a long term of years, the mortality from scarlet-fever is about eight times, and from diphtheria about sixteen times greater than from small-pox. In Europe also the mortality from scarlet-fever and diphtheria is large compared with that from small-pox. Taking up at random monthly reports from the province of Madrid, Spain, I find that in August, 1883, the deaths from diphtheria were 83 ; scarlet-fever, 18 ; small-pox, 24. August, 1884, deaths from diphtheria in the province of Madrid, Spain, 120 ; scarlet-fever, 20 ; small-pox, 9. December, 1884, diphtheria, 118 ; scarlet-fever, 8 ; small-pox, 19. Pursuing the same course with Copenhagen, Denmark, I find that in October, 1885, there were : of diphtheria, 455 cases ; of scarlet-fever, 526 cases, and of small-pox, 16 cases ; in November, 1885 : of diphtheria, 536 cases ; of scarlet-fever, 547 cases ; of small-pox, 7 cases ; in December, 1885, there were : of diphtheria, 633 cases, of scarlet-fever, 595 cases, and only 28 of small-pox ; in the next month, of diphtheria there were 703 cases ; of scarlet-fever, 624 cases, and of small-pox, 5 cases.

I do not suppose that many unprejudiced persons will now dispute that diphtheria and scarlet-fever are conveyed, among other means, by clothing ; and that imported rags, coming, as they do, from so many places, from the homes of the people, where those diseases are constantly occurring, can be the cause of outbreaks in this country. The presumption is that in every large lot of rags, gathered as they are, some will be likely to be infected with the causes of those diseases, because the diseases are so widely distributed and are so constant. There is not a country in Europe free from them any week of the year, and there is not a large city that is now ever free of them. In the table in THE SANITARIAN, June, 1886, page 567, you show that diphtheria was present in 47 of the

cities of Europe during January, February, and March, 1886, and I can add Madrid, Rome, and Copenhagen. Your table includes all of the countries which I have previously named, also Ireland, Sweden, Norway, and the Netherlands. Scarlet-fever, according to your table, was present in 44 of those cities, to which also can be added Madrid, Rome, and Copenhagen. In the March number, 1885, you show that diphtheria and scarlet-fever were present during the year 1884 in 48 of the large cities of Europe, and the figures are so large as to make it certain that those diseases are constantly making havoc among the people.

Cases of small-pox in this country have been traced to rags; but I do not know that any attempt has been made to trace diphtheria and scarlet-fever to them. Yet I consider the danger of our getting diphtheria and scarlet-fever from such rags much greater than of small-pox. Small-pox is more easily traced than are the other diseases; it is never so subtle and mysterious; while, strange to say, it yet causes greater popular apprehension, which makes a discovery of the source of contagium more certain. We know that immigrants from Europe having diphtheria and scarlet-fever, or carrying the contagium in their clothes, land in New York every year. Speaking of scarlet-fever, the Fifth Annual Report of the State Board of Health of New York (page 5) says that the cities of New York and Brooklyn, "as might be expected from their constant influx of immigrants," bear the principal brunt. But such diseases spread so easily that they are not confined to either of those cities—they spread throughout nearly this entire country.

In considering this question of disinfecting imported rags, it is well, then, to remember these points:

1. Diphtheria and scarlet-fever are very much more destructive everywhere than is small-pox.

2. Diphtheria and scarlet-fever are never absent from any European country.

3. Rags collected from the homes of the people of Europe are more likely to convey diphtheria and scarlet-fever than small-pox.

4. The sooner public attention is attracted to the many ways in which those diseases—scarlet-fever and diphtheria—

which actually destroy our people by the thousands, are introduced and spread, especially throughout the Northern States, the sooner will it become practicable to prevent the introduction of those diseases.

5. If United States consuls could have, as we have, through our system of exchanges, the knowledge relative to the presence of the really dangerous diseases in each of the foreign cities and countries, it would probably be impossible for them to truthfully give such a certificate as required by the resolution of the New York Chamber of Commerce. The last clause of the first resolution adopted by the Chamber should then be operative. It reads as follows: "In the absence of such certificate, rags coming from a port or country claimed to be free from such diseases shall be disinfected on arrival."

Very respectfully,

HENRY B. BAKER.

LANSING, MICH., July 8, 1886.

THE MORTALITY OF CHILDREN.

THE mortality of children during their first year of life has been observed and very ably compiled by V. Firks, Member of the Royal Statistical Bureau of Prussia, taking for a basis of his conclusions the records for the period of from 1875 to 1883. The following results are culled from his observations: Of each 1000 legitimate children, including still-borns, on an average 776 survived the first year of life; of each 1000 illegitimate, only 615, girls preponderating somewhat—while boys are in the minority. The condition of the parents exerts a greater influence upon the babies than their sex, while in all grades of life legitimate girls are subject to the least mortality, illegitimate girls to the greatest, and illegitimate boys to a lower rate of mortality than legitimate girls. At the time of birth the probable expectation of life of legitimate boys amounts to 39.26 years; legitimate girls, 43.76 years; illegitimate boys, however, only 15.2 years; illegitimate girls, 25.0 years. After completing the fifth year of life, an increased jeopardy in their life intervenes, which very probably is due to their altered condition of nourishment. The death rate of legitimate children is a standard for the average condition of

life of the population, because the love of the parents for their offspring prompts them to prolong the life of the latter to the extent of the means at their disposal. In three parts of Prussia the death rate of legitimate children is very large—in all three of which a large part of the population is very poor. The religious tendency of the parents is cited in connection with the mortality of children. Of each 1000 born legitimate, there died before the completion of the first year: Of Evangelical parents, 229; Catholic, 223; Jewish, 172. Of each 1000 illegitimate births there survived the first year: Of Evangelical mothers, 624; Catholic, 603; Jewish, 592. Illegitimate children of Jewish mothers are, according to this, subject to a much higher rate of mortality, and, what is more singular yet, still-births of boys are more common with Jewish mothers than with Evangelical or Catholic. The branch of industry of the parents, more especially that of the mother, exerts a very great influence upon the mortality of children. Several trades have a very pernicious influence; first in line is the textile branch, if followed as a domestic industry. The manner of dwelling of the parents also has an influence, both upon legitimate and illegitimate children. The death rate of children in their first year of life is greatest in large cities, smallest in the country.—*London Insurance Record.*

AN ACT TO PREVENT THE SPREAD OF CONTAGIOUS AND INFECTIOUS DISEASES.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Whenever the body of any deceased person is to be transported over the railroads of this State, or upon any passenger steamboat plying upon the rivers of this State, the Board of Health to which application is made for a transit permit for the transportation of such body shall, if the physician's certificate or the permit accompanying such body state the cause of death to have been a contagious or infectious disease, require that such body be enclosed in an hermetically sealed casket of metal or other indestructible material.

SEC. 2. This act shall take effect immediately.

Having been approved by the Governor, has become a law.

THE HEALTH OF CHILDREN.

AMONG the most important laws recently enacted by the State of New York is the following:

SECTION 1. Every institution in this State incorporated for the express purpose of receiving or caring for orphan, vagrant, or destitute children, or juvenile delinquents, excepting hospitals, shall have attached thereto a regular physician, duly licensed to practise under the laws of this State and in good professional standing.

SEC. 2. The name of such physician and his address shall be posted and be kept posted conspicuously within such institution, near its main entrance.

SEC. 3. It shall be the duty of the officers of such institution upon receiving any child therein, either upon commitment or otherwise, before admitting it to contact with any other of its inmates, to cause such child to be examined by said physician, and a certificate in writing to be given by him, stating whether such child is apparently suffering with diphtheria, scarlet-fever, measles, whooping-cough, or any other contagious or infectious disease, especially of the eyes or skin, which might be communicated to the other inmates thereof. Such physician shall specify in such certificate the physical and mental condition of the child, the presence of any indication of hereditary or other constitutional disease, and also any deformity or abnormal condition which he may find upon examination to exist. Such certificate shall be kept by the officers of the institution filed with the commitment or other papers on record in the case, and no child shall be so admitted until after such certificate shall have been furnished as above provided.

SEC. 4. On receipt of such certificate the officer of such institution shall, on receiving such child, place it in strict quarantine for ten days thereafter from the other inmates of the institution; and at the expiration of said ten days the child shall be again examined by such physician and an indorsement then made by him on such certificate of any change since the previous examination.

SEC. 5. It shall be the duty of such physician at least once a month to thoroughly examine and inspect the entire institution, and to report in writing, in such form as shall be approved by the State Board of Health, to the Board of Managers or Directors of such institution, and also to the Board of Health within the district or place where the institution is situated, its condition especially as to the plumbing, sinks, water-closets, urinals, privies, and dormitories, and also as to the physical condition of the children and the existence of any contagious or infectious diseases, as to their food, clothing, and cleanliness, and also whether the officers of such institutions have provided proper and sufficient nurses, orderlies, and other attendants. It shall be the duty of such boards to immediately investigate any complaint, and if the same prove to be well founded to remedy the evil without delay.

SEC. 6. No child suffering from any contagious or infectious disease, especially of the eyes or skin, shall be allowed to enter or remain in any such institution in contact with any children not so afflicted, unless it shall immediately be isolated or placed in a proper room or infirmary which shall be provided for that purpose by the officers of the institution under the direction of said physician.

SEC. 7. The beds in every dormitory in such institution shall be separated by a passageway of not less than two feet horizontally, and all the beds shall be so arranged that under each of them the air shall freely circulate and there be adequate ventilation. Every dormitory shall be provided with special means of ventilation, as the Board of Health within the locality may prescribe. In the dormitories of such institutions six hundred cubic feet of air space shall be provided and allowed for each bed or occupant, and no more beds or occupants shall be permitted than those provided in this way, unless free and adequate means of ventilation exist, approved by the Board of Health and a special permit in writing be granted therefor, specifying the number of beds or the cubic air space which shall, under special circumstances, be allowed. Such permit shall be conspicuously posted and kept posted in each dormitory. It shall be the duty of the physician attached to any such institution to at once notify in writing the local Board of Health and the Board of Managers or Directors of

such institution if the provisions of this section are at any time violated.

SEC. 8. The words "juvenile delinquents" in this act shall include all children whose commitment to an institution is provided for by the provisions of Penal Code.

SEC. 9. Any person who shall admit, neglect, or refuse to comply with, or to discharge any duty imposed by this act, or who shall violate any section thereof, shall be guilty of a misdemeanor.

SEC. 10. This act shall take effect on the first day of July, eighteen hundred and eighty-six.

THE SEASIDE HOME OF THE BROOKLYN CHILDREN'S AID SOCIETY, CONEY ISLAND.

The 16th day of June, 1886, was a happy day in the progress of one of the earliest and most signal efforts in the history of practical sanitation for the preservation of the health of poor children. It was the opening day of the new Seaside Home located on Coney Island beach, about a quarter of a mile west from Culver's railroad depot—occupying part of the same site selected eighteen years ago by officers in authority for a portion of the New York quarantine establishment. At this opening of the Children's Seaside Home, even more than ever before, we indulged the most gratifying recollections of our participation in the effort which prevented the quarantine authorities from carrying out their purpose, and, with the aid of the late Hon. Henry C. Murphy, forcing them to abide by the conditions of the quarantine law of 1863, which gave the State a better quarantine and reserved this site for the most delightful of all purposes.

The opening exercises were attended by the Trustees and a larger number of well-known patrons and other guests. A. T. White, Esq., one of the Vice-Presidents, presided. After a hymn, written for the occasion by Mrs. William A. Lawrence, had been sung, Rev. Theodore L. Cuyler engaged in prayer. Rev. Charles Cuthbert Hall then delivered an address. He said: "In the new Home, like in Spain, 'the child is king.' In this new Home a little child especially is king.

If those present would visit the piazzas a few weeks later they could see and learn that creed, 'The child is king.' Although having but few of the attributes of a hospital, it was a true hospital. In monastic times a hospital chiefly gave the idea of a guest-house for children. Here they were welcomed during the heated term. To those weary of the pilgrimage of life the Aid Society said, 'Little ones, here is your rest; tarry here and be strengthened.'"

The speaker believed the work was specially a great one, and would quote the words of the Master, "I was a stranger and ye took me in." He spoke further of the terrific consequences of that undesirable but inexorable natural law that the innocent and irresponsible must bear a cross through no fault of their own. The sins of others caused the pains of little children of the poor. The element of vice inextricably blended that mysterious and awful sentence that the sins of the fathers shall be visited upon the children.

The reverend gentleman had been informed that the Home was the growth of ten years' experience. He dwelt upon the fact that it was to be a Home for the mothers who bring their little children. He referred to the peculiar mystery of triumphant heart-love which fills a mother's breast when she sees her child brought back from death's door, and it was this feeling which made mothers—aye, and fathers, too—sympathize with such a holy cause, quoting the words of Professor Wilson as proof, "Because my child is dead I must weep at the grave of yours."

It was Richard Douglass, he said, who could forget his own sleep and walk up and down the cool piazzas with a little child in his arms through the long night, in order to give the child relief and its mother rest. That noble, departed spirit had dreamed of such a home in which the speaker and his auditors stood. He dreamed, too, of a mountain home for children whose sickness needed mountain air, and Mr. Hall believed erelong his full dream would be realized, and that not until then would the Children's Aid Society have all facilities to meet the requirements of its work.

All present then read the Act of Dedication, and after the hymn, "Sun of My Soul, Thou Saviour Dear," had been sung, Rev. Dr. Reed pronounced the benediction.

The new Home consists of a main building, now complete, the cottage hitherto known as the Abbott Cottage, which has been in use several years, and four cottages approaching completion, all together said to be sufficient to accommodate at one time about four hundred children and their necessary attendants. The main building is a somewhat imposing Gothic structure, finished, for the most part, inside in hard wood, with an evident idea to general utility by those who devised it, but in its inside architectural details with too little regard to some important sanitary requirements. Had the architect availed himself of the advice of Dr. S. Fleet Speir, one of the trustees, with whom the idea of this establishment originated, or any one of several physicians in Brooklyn familiar with the essential necessity for maintaining the free circulation of indoor air in such an institution, its interior arrangements would have been much less like a hotel, with its numerous small, tight rooms and closets, but provided instead, and at less expense, with large, airy rooms and movable screens, admitting the free circulation of the air throughout, yet susceptible of arrangement in regard to space according to the needs of the occupants. There would have been good plumbing fixtures and good plumbing, no boxed-up washstands and water-closets, or other more or less similar recesses into which filth is ever prone to accumulate, always in conflict with health and requiring constant warfare against odds, even under the most favorable circumstances. But, as in this case, with children for subjects, and withal requiring hospital appointments, more practical knowledge of sanitation was required for both the construction and furnishing of the institution than has here been used. This is the more regrettable since it appears to have been a departure from the generous principles which imbued the spirit of its lamented and most active promoter at the outset.

In his report for 1876 Mr. Douglass remarks that :

" Soon after we established the Fresh-Air Fund we found many needy cases which could not be helped by a single day's excursion. We therefore, under Dr. S. Fleet Speir's advice, hired board at the seashore for several mothers, for a few days each, using a small portion of the fund for this purpose. The experiment worked well, and from this small beginning

we have stepped, by the aid of another of our trustees, into the position of owner and manager of the first permanent institution that receives mothers and young children, and counteracts, as far as it may, the effects of those diseases which sweep their thousands from the poorer classes into untimely graves."

Believing THE SANITARIAN to have been among the foremost publications to advocate free sanitariums for sick and debilitated children of the poor of crowded cities during the summer months (see "Free Parks and Camping-Grounds for Children," by J. M. Toner, M.D., Vol. I., p. 71, May, 1873), and deeming further particulars in regard to the establishment of this, the first institution of the kind, eminently worthy of more extensive record in our pages, Dr. Speir has, at our request, kindly furnished the following:

162 MONTAGUE STREET, BROOKLYN, L. I., July 1, 1886.

Dr. A. N. Bell.

MY DEAR DOCTOR: In reply to your request, I desire to say that I do not recall the exact date of my first interest in the subject of seaside care for the sick children of the poor. It was during the early history of the Children's Aid Society of Brooklyn.

The idea was developed through my having charge of the sick children of the Society. The earnestness of Mr. Kirkby and Mr. Douglass in their work made it apparent that something more could be done for the little ones, and I suggested to them the plan of seaside care. An experiment was soon made by taking a few mothers with their children to Bath, L. I., where board was secured for them in private families.

When the children's health was sufficiently restored their place was taken by other needy ones. This plan worked so well that Mr. Kirkby and Mr. Douglass applied themselves to the task of establishing a permanent seaside home.

As near as I can remember, it was in 1871 and 1872 that our first cases were sent to Bath—as you will see by referring to the annual report of Brooklyn Children's Aid Society for 1872. You will remember the "Open-Air Fund" was promulgated by the New York *Times* in the summer of 1872. The following summer the *Eagle* and *Union* of Brooklyn took it up, and

that summer the Home took organized steps toward sending sick children and their mothers to the shore. It was prior to this that Mr. Kirkby, Mr. Douglass, and myself had our consultations and laid the plans, working up the idea and applying the test of experiments. So that, as far as I know, our work was prior to and independent of any other workers in the same field.

Very sincerely yours,

S. FLEET SPEIR, M.D.

It should have been borne in mind that Dr. Speir was no less competent to make important suggestions in regard to the details of this institution than he was to propose it in the first place.

This is the *third* structure and site by the Society, brought about by the necessity for enlargement and the progress of other advancing interests in the neighborhood, but it now seems to have gained a permanent foothold, and right worthily occupied it, barring the errors of detail above referred to, which experience will doubtless soon rectify.

It is worthily said of Dr. Jerome Walker, in the report for 1885, as indeed, in substance, in the preceding reports: "Of those in charge of the office work in Brooklyn, Dr. Walker, from his long connection with the work as visiting and resident physician at the Home, had an acquaintance with many of the mothers and children which, aside from his professional skill, rendered him specially fitted for his part in the year's work."

Inmates are admitted on the recommendation of the physicians of Brooklyn, all of whom are supplied with forms of recommendation returnable, filled, to the city office, 61 Poplar Street, where they are indorsed by the physician in charge and permits issued.

Manager: Mrs. R. D. Douglass, assisted by her son, Mr. Lawrence Douglass, Miss Ida Shattuck, and Mr. and Mrs. John Amberman. Senior Physician: Jerome Walker, M.D. Resident Physician: W. F. Dudley, M.D.

A. N. BELL.

EDITOR'S TABLE.

MORTALITY AND MORBILITY STATISTICS.

WITH the great increase in the number of local Boards of Health recently, as the legitimate outcome of the increase in the number of State Boards throughout the country, we find it impracticable to continue the tabulation of mortality and morbility statistics from the reports of local Boards as we have hitherto practised. We purpose instead to rely upon and make more of the National and State Boards reports; continuing, however, as heretofore, to review the annual and special reports of local Boards. We therefore request that *all* Boards of Health, National, State, and local, Army, Navy, and Marine Hospital Departments, and all hospitals and other institutions interested in sanitation and vital statistics, will be kind enough to send us copies of their reports of all kinds as promptly as possible after issue, with a view to elucidating their relative and consolidated values. By thus doing we are satisfied much can be done to correct the prevailing error, of which we have by no means been unmindful, of over-estimated populations with the effect of misleading statements of the death rates.

A low death rate is a subject of just pride on the part of health officers and registrars of vital statistics who are interested in their work, but whenever a low death rate is made to appear by illegitimate means it brings discredit upon practical sanitation. It has become too much the custom to estimate local populations by the ratio of increase from year to year based upon the gross increase during the preceding census decade, in the face of the fact that in the processes of commerce and the rapid movements of people in this country some populations suddenly come to a stand-still, others as suddenly advance and multiply, almost as if by magic, and a few decline.

The death rates for the census years are presumably correct, and in some of the cities and States where intermediate official enumerations are made correct estimates are, for the most part, maintained. But besides these, there are many com-

munities in which the registrars of vital statistics are in the habit of estimating the population for each year, based upon the school attendance, or some other equally unreliable standard; such estimates are almost invariably too high, and the death rates consequently placed too low.

For a few years before the last census St. Louis showed a marvellously low death rate—of about 11 per 1000—based upon an estimated population of 500,000. The census dispelled this fallacy by showing the population to be only 350,518, and the true death rate 20 and upward. Baltimore claimed a population of 393,796, and a mortality usually about or a little less than 20 per 1000. The census enumeration showed 332,213, and consequently the true death rate about 24. But Baltimore repudiated the census enumeration, and continues to repudiate it, showing the while a relatively low death rate, but a large ratio of deaths from preventable diseases—conditions always suggestive of an over-estimated population, for they are very rarely otherwise associated. Providence, after an estimate of an increasing population for several years, amounting in 1877, as was supposed, to upward of 103,000, and a death rate of about 23, by an actual enumeration, January 1st, 1878, under the direction of Dr. E. M. Snow, City Registrar, was found to have but 99,682, and the true death rate proportionally higher. Dr. Snow's remarks in his report at that time are equally pertinent to the present:

"As every city within my knowledge, without exception, estimates its population as having largely increased within the last few years, the results of our census may be a suggestive hint that such increased estimates may possibly be not well founded."

As the State Boards of Health are entirely free from all such influences as have tended to stimulate such errors as those here referred to, and are desirous of overcoming all obstacles to correct and full registrations of vital, disease, and mortality statistics, if they will be kind enough to comply with this request, we promise a cordial support in the promotion of their purposes.

Of foreign statistics we also discontinue the table, and, in addition to National Board reports, give an abstract from reports and exchanges instead.

CALIFORNIA.—Reports received from ninety localities for the month of May continue to indicate a very favorable condition of the public health, and an absence of any severe epidemic disease. *Consumption* decreased its death rate from 132 last month to 123 this month. *Pneumonia.* likewise shows a lessened mortality, the majority of deaths from this cause occurring in San Francisco. *Diphtheria* seems to cause more deaths than any other zymotic disease on the coast. Thirty-one deaths are recorded this month, an increase from last month of 4. Twenty-two of these took place in San Francisco, 1 in Etna, 1 in Fresno, 1 in Los Gatos, 1 in Oakland, 2 in Petaluma, 1 in Stockton, 1 in Santa Maria, and 1 in Truckee. *Croup* caused 8 deaths, a decreased mortality from last month. *Whooping-cough* was fatal in 16 instances, an increase of 12 from last report. *Scarlet-fever* caused 7 deaths, which is a trifling mortality for so serious a disease. It indicates mildness of type. *Measles* had a mortality of 2 this month. *Diarrhœa and Dysentery* caused 8 deaths, which is double that of last report. *Cholera-Infantum* shows a decidedly increased mortality, being credited with 14 deaths, against 6 last month. *Typhoid-fever* caused 13 deaths, a decrease of 4 from last report. *Typho-malarial-fever* was fatal in 1 case only. *Remittent- and Intermittent-fevers* are credited with 5 deaths, which is an increase of 5 from last report. *Cerebro-spinal-fever* had a mortality of 10, which is a slight decrease from last month. Three occurred in Los Angeles, 3 in Watsonville, 1 in Ventura, 1 in St. Helena, 1 in Shasta, and 1 in Elk Grove. The reports indicate that up to the present time no severe zymotic sickness of any kind exists in the State—in fact, it has rarely enjoyed so great and so general an immunity from all serious diseases as during the past few months.

CONNECTICUT.—In 9 cities, for May, representing a population of 276,000, or about three eighths of the population of the whole State, the death rate was 14.02 to the 1000 people, as compared with 18.9 in the month of April in the same cities. So far as this estimate may stand for the general health of Connecticut, it shows a very gratifying improvement over the health of the preceding month.

While about the same list of fatal diseases are reported from

the various towns, the marked diminution in their fatality is to be noticed. The most fatal diseases in April were consumption and pneumonia.

In April there were 74 fatal cases of consumption in the above 9 cities, but in May only 60. In April there were 73 fatal cases of pneumonia in the same, but in May only 18.

How much a general improved state of health is to be attributed directly to warmer weather, and how much indirectly to the escape from the confined and unwholesome air of houses, which warmer weather permits, is a very difficult question to solve.

The open air, free and pure, is an acknowledged essential of health. House air is often foul and even poisoned. There is much reason to think that open doors and windows which warm weather allows has more to do with diminished sickness than a merely higher temperature.

MICHIGAN.—For the month of May, 1886, compared with the preceding month, the reports indicate that diarrhœa and measles increased, and that influenza, bronchitis, pneumonia, and tonsillitis decreased in prevalence.

Compared with the preceding month, the temperature in the month of May, 1886, was higher, the absolute humidity and the day and the night ozone were more, and the relative humidity was the same.

Compared with the average for the month of May in the eight years, 1879–86, intermittent-fever, measles, pneumonia, remittent-fever and bronchitis were less prevalent in May, 1886.

For the month of May, 1886, compared with the average of corresponding months for the eight years 1879–86, the temperature and the absolute humidity were about the same, the relative humidity and the day and the night ozone were more.

Including reports by regular observers and others, diphtheria was reported prevalent in Michigan in the month of May, 1886, at 51 places, scarlet-fever at 39 places, measles at 21 places, and typhoid-fever at 6 places.

Reports from all sources show diphtheria reported at 11 places more, scarlet-fever at 8 places more, typhoid-fever at 2 places more, and measles at 12 places more in the month of May than in the preceding month.

A Sanitary Convention will be held, under the auspices of the State Board, at Coldwater, September 23d–24th next. Among the subjects which it is expected will be presented and discussed are the following :

Disposal of Waste in Coldwater by Sewerage or otherwise ; Water Supplies and their Impurities ; the present condition of the Water Supply of Coldwater, and prospects for the future ; Stimulants and Narcotics—their influence upon Mental and Physical Health ; Ventilation ; Diseases in this and Foreign Countries compared ; the Causes and Prevention of Consumption ; the Prevention and Restriction of Communicable Diseases ; Personal Duties and Responsibilities for the Preservation of the Public Health ; Relations of the Press to Sanitation ; the Obligations of Women to the Sanitary condition of Homes.

For further information address L. A. Warsabo, M.D., Secretary, Coldwater, Mich.

MINNESOTA.—Infectious diseases reported for the month of May : *Diphtheria*, 5 cases, 2 deaths ; *Scarlatina*, 35 cases, 13 deaths. *Diseases of Animals :* Glanders, cases remaining on hand not accounted for at first of month, 61 ; reported during the month, 17 ; killed, 21 ; released, 12 ; isolated, 9 ; remaining May 1st, isolated or not accounted for, 37. There are now 1016 local Boards of Health in the State, every one of which is reported to be in hearty co-operation with the State Board in a widespread organization of sanitary effort.

OHIO.—Dr. Ashmun has declined the office of secretary and executive officer of the State Board of Health, to which he was recently elected, the Board of Health of Cleveland having increased his inducements to continue in the office of health officer of that city, which he has so creditably filled for several years. Dr. Guy B. Case, of Cleveland, the predecessor of Dr. Ashmun, has been elected in his place, who, it is understood, will comply with the requirements of the State Board to reside in Columbus. Cleveland stands foremost among the cities of the State in health administration ; hence, presumably, the State Board has shown wisdom in choosing an executive officer who has had experience in that city.

NEW HAMPSHIRE.—Registration of births, marriages, divorces, and deaths for the year 1884: *Population*, 346,982; *births*, 6247; *marriages*, 5292; *divorces*, 315; *deaths*, 6194. Birth rate per 1000, 21.85; death rate, 17.85. Eight hundred and sixty-eight deaths, or 14.01 per cent of the total mortality, were caused by consumption. The next most prolific cause was heart disease—483. Four hundred and fifty deaths are attributed to old age. From zymotic diseases the proportion was relatively small. The most fatal was cholera-infantum—266; other diarrhœal diseases killed 131. Typhoid-fever, 117; diphtheria and croup, 159.

NEW YORK.—The Fifth Annual Report of the State Board of Health, for the year 1884, is a volume of 483 pages, with numerous illustrative maps of defective drainage and the relations of miasmatic and other diseases to local conditions. The report opens with a statement of the incompleteness of the registration of vital statistics consequent upon the attendance of midwives and other persons at births and deaths, but who are as ignorant of the requirements of the registration law as they are of medicine. "The only practical method to secure an approach to completeness in this respect," the report remarks, "would be to make the parents or custodians of infants responsible for securing the registration of births." But the records of death are also incomplete. "Notwithstanding a prohibition of burials without a permit based upon a certificate of death, in many of the smaller communities, and, indeed, in some of the cities of the State, undertakers and others manage to evade the law, and very many deaths have thus remained unrecorded." Several reasons are assigned for this, among them inaccurate estimates of population, inefficiency of health organizations, carelessness of registrars, etc.; but *the* one above all others which is at fault, in consequence of a defect in the State law, to which we have frequently had occasion to advert, is the *incompetency* of the registrars; and this will doubtless continue so long as the clerical duties of the registration and granting of burial permits remain in the hands of town clerks and specified clerks in cities and villages, notwithstanding—

"It shall be the duty of the Board of Health in each town,

village, and city to have the supervision of registration of deaths, diseases, and the causes of death, and by its appointed officers to examine all certificates and records of death and findings of coroners' juries, and to designate persons who shall grant permits of the burial of the dead . . . to supervise and make complete the registration of births, deaths, and marriages within the limits of its jurisdiction."

When the law is so amended as to make it the duty of all town, village, and city authorities to appoint as registrars of vital statistics, authorized to grant burial permits, *physicians* competent to exercise the duty of inquiring into the causes of diseases and deaths, instead of town clerks and other specified clerks, who are not even competent to distinguish between the synonyms of the same disease and different diseases, much less to appreciate the causes of disease and death, we may reasonably hope for substantial improvement.

During the last three quarters of the year 1884 there were reported to the State Bureau of Vital Statistics 56,353 deaths from all causes. Of these 13,256, or 23.5 per cent, were caused by the principal zymotic diseases. But the secretary remarks:

"The deaths recorded do not show the total mortality of the State. Even making no allowance for deficient returns from some of the twenty-two cities, with their conjoined computed population of 2,644,155, and estimating the whole population of the State at but 5,350,000, we have a remainder of 2,705,845, which, if the annual death rate did not exceed 17 per 1000, would give for the nine months 34,499 deaths. Since not more than 10,640 have been returned to the State Bureau, it is apparent that considerably more than 23,000 deaths have escaped the record; and if the same ratio were maintained throughout we should have more than 6000 to add to the list of zymotic mortality."

Defective school hygiene is worthily referred to, and, as illustrating the singular obtuseness of some school boards, the extension of the wing of a school-house over two old uncleansed privy pits at Lansingburg, in consequence of which there was an outbreak of diphtheria, and the proposal to build a public school upon an abandoned burial-ground at Port Jervis, are cited. In both instances the soil was found to be

swarming with bacterium termo—the invariable concomitants of putrefactive processes.

Of the special committee and other reports, among the most notable are "Anticipative Cholera," by Hon. Erastus Brooks, giving an account in detail of the discussions and recommendations by the Conference of the State Boards of Health, 1884, and "Maritime Sanitation at the Port of New York," by Dr. William M. Smith, Health Officer of the Port, with regard to cholera. But the measures here recommended have already been reviewed in our pages. Numerous short reports and investigations by Dr. A. L. Carroll, Secretary and Executive Officer, and several by committees and individual members of the Board, cover a large field of practical sanitary work of great importance and permanent benefit to the well-being of the people of the State.

In the *Bulletin* for April, 1886, of 6659 deaths reported from the chief centres of population, 31.7 per cent were under the age of five years. From zymotic diseases there were 982 deaths, a ratio per 1000 total mortality of 147.45. The ratio per 1000 of deaths from typhoid-fever is 6.75; from diarrhœal diseases, 18.46; from croup and diphtheria, 59.15. Diphtheria has been epidemic in New Rochelle, Bethlehem, and North Hempstead, the latter originating from a school-house. One case of small-pox has been reported from Gravesend; deaths occurred only in New York City. No deaths from typhus-fever are reported. The other principal preventable diseases were scarlet-fever and whooping-cough. From consumption the ratio of mortality is 162.91 per 1000 deaths from all causes; and 235.61 per 1000 deaths above the age of five years. The combined death ratio per 1000 from zymotic diseases, consumption and puerperal diseases, is 321.32. From acute respiratory diseases there were 125.38 deaths per 1000. There were 162 delayed returns received for April, from Cohoes, Fort Edward, Baldwinsville, Cortland, and other localities noted in the last *Bulletin*. Computations of population of the cities, made by the late secretary, show the present estimate of many of them as too high.

NORTH CAROLINA.—We are gratified that this State Board has also fallen into the line of issuing a monthly bulletin.

Numbers 1 and 2, for April and May, received. Number 1 sets forth the duties of the Board to take cognizance of the health interests of the citizens of the State; make sanitary investigations; inquire into the effects of locations, employments, and conditions upon the public health, etc. "They shall gather such information upon all these matters for distribution among the people, with the special purpose of informing them about preventable diseases. . . . The main work of the past year has been that of organizing and getting the counties drawn up in line of battle to meet and repel our people's deadliest foe—epidemic. Thus far forty-three counties have formed local Boards of Health, with accessions constantly coming in." The county reports are given in detail only, and therefore do not show the extent of epidemic diseases at a glance, as they would if summarized, as they should be.

Zymotic diseases reported for the month of April are as follows:

Buncombe County.—Diphtheria, with acute bronchitis and pneumonia, prevailing in city and different portions of the county. *Catawba.*—Five cases whooping-cough, 4 of scarlatina, 2 of diphtheria, and 1 of typhoid-fever. *Chatham.*—Roseola and whooping-cough have prevailed to some extent in various portions of county. *Cherokee.*—An epidemic of cholera among hogs. *Cleveland.*—Measles and whooping-cough prevailing in all portions of the county. *Columbus.*—One case of typhoid-fever. *Cumberland.*—Twenty cases of measles, 4 of typhoid-fever, and about 100 of whooping-cough. *Davidson.*—Twenty cases whooping-cough, 7 scarlatina, 8 diphtheria, 4 typhoid-fever, and 20 rötheln. *Forsyth.*—Quite a number of cases of whooping-cough. *Franklin.*—One case of typhoid-fever. *Gaston.*—Two cases of measles and 6 of pernicious malarial-fever. *Greene.*—Two cases diphtheria and 1 hemorrhagic malarial-fever. *Henderson.*—Two cases measles and 1 diphtheria. *Iredell.*—Whooping-cough has gone over the county pretty generally; there has been some scarlatina. *Johnston.*—One hundred cases whooping-cough, 30 of typhoid-fever, and 5 of hemorrhagic malarial-fever. Whooping-cough and roseola have prevailed all over the county. An epidemic of cholera among domestic animals. *Jones.*—Four cases of

scarlatina. *McDowell.*—Five cases of measles and 6 of typhoid-fever. *New Hanover.*—Twenty cases of German fever (rötheln), 40 of whooping-cough, 2 of diphtheria, 2 of typhoid-fever, 2 of pernicious malarial-fever, and 1 of hemorrhagic malarial-fever. Erysipelas, whooping-cough, and measles have prevailed in most parts of the city (Wilmington) and county. There has been a greater number of cases of these three diseases than in many years past. Also an epidemic of hog-cholera has prevailed. *Onslow.*—No contagious diseases have occurred, but there has been, however, an epidemic of cholera among domestic animals. *Pitt.*—A good many cases of whooping-cough and a few cases each of dysentery, pneumonia, and intermittent-fever. *Richmond.*—A few cases of whooping-cough. *Robeson.*—Eight cases diphtheria. *Rowan.*—One case diphtheria, and whooping-cough prevailing in nearly every portion of county. *Rutherford.*—Forty cases of measles occurring in different parts of the county. *Sampson.*—Three cases of typhoid-fever. Also an epidemic of hog-cholera. *Tyrrell.*—Three cases of diphtheria, and 5 of typhoid-fever. *Vance.*—Two cases of typhoid-fever. *Warren.*—Three cases typhoid-fever. *Watauga.*—Ten cases measles, 40 whooping-cough, and 2 of typhoid-fever. An epidemic of lung-fever has prevailed among horses and mules to a limited extent. Five or six have died.

Tabulated statistics on jails and poor-houses by counties follow, showing the number of persons, space allotted each inmate (in cubic feet), number giving evidence of successful vaccination, and number who can read and write. In the summary for March, of 28 jails reported upon, containing 279 prisoners, 4 give less than 500 cubic feet of air space per capita, and 1 in Wayne County, containing 24 prisoners, gives only 61 cubic feet of air space each! Of 35 poor-houses, with 484 inmates, 1 only, which gives less than 500 cubic feet of air space per capita—that ones gives 300. Of the rest, both jails and poor-houses, in most of them the space is ample.

In the report for April special attention is called to the jail at Goldsboro, in Wayne County. "This jail contains two corridors aggregating 910 cubic feet, and four cells of 364 cubic feet each, making a total of 2366 cubic feet in the whole jail. As '700 cubic feet of respirable air per man, suitably renewed,

is as little as will guarantee the health of each inmate,' it will be seen that these cells are only about half the size they should be to be occupied by *one person*, yet the superintendent of health of that county reports the horrible condition of *twenty-five* prisoners being crowded into this prison, which is hardly large enough for four, and which the Wilmington *Star*, in an editorial criticising the horrors of the situation there, likens to the 'Black Hole of Calcutta'! Nor is this only a temporary condition of things, the reports for the past four months showing not less than *twenty-three* prisoners confined there at any time.

"Did all the superintendents do their duty and report fully and accurately on the condition of their county jails, we have no doubt that other and as horrible conditions would be unveiled. Let the judges of the circuit courts follow the example set by Judge Branham, and lay especial stress on that part of their charge to the grand juries which relates to the inspection of public buildings for the confinement of prisoners and paupers, and let the visits of inspection by both grand jury and superintendents of health be made unexpectedly to the keepers of these institutions, that they may be taken unawares, and not have time to put their premises in a temporarily good condition which will mislead the inspectors.

"Summer—and the indications are for a hot one—is almost upon us, and something should and will be done to make the number of prisoners confined, and the cubic space allotted them, more proportionate; for if the county authorities do not increase the space disease and death will most assuredly reduce the number of inmates. No right-thinking man will hesitate which is the more desirable alternative, even from an economic standpoint, and certainly the spirit of humanity and Christian civilization should have some influence in this important matter."

TENNESSEE.—State Board Bulletin for the month of May reports a marked diminution in all acute diseases throughout the State, chronic affections generally improved, and the death rate from all causes small.

Whooping-cough is reported in the counties of Dyer, McMinn, Montgomery, Obion, Rutherford, and Shelby; *diphtheria* in

Davidson, Hardin, Montgomery, and Williamson; *measles* in Franklin, Hamilton, Maury, and Smith; *mumps* in Jefferson, Maury, McMinn, and Washington; *roseola* in Giles and Stewart; and *chicken-pox* in Giles.

Death rates.—Chattanooga, white, 18.04; colored, 32.04 : 24.00
" " Knoxville, " 11.55; " 24.00 : 14.24
" " Memphis, " 9.25; " 32.53 : 17.51
" " Nashville, " 11.54; " 28.30 : 17.51

Meteorology.—The mean temperature for May was 67°.04, 2°.51 above the mean for May, 1885, and only a fraction above that for May of the year previous. The highest temperature, 91°, recorded on the 13th, was 3° below the maximum of May, 1885, and 1° above that of May, 1884. The lowest temperature, 36°, recorded about the 1st and 3d, was respectively 3° above and 3° below the minimums of the corresponding periods of 1885 and 1884. The monthly range of temperature was 55°, 6° less than in 1885, and 4° more than in 1884.

The mean precipitation was 4.42 inches, a fraction over the means for May of the two preceding years. Of this amount the Eastern division received about 5½ inches, the Middle division received about 3½ inches, and the Western division received nearly 4¾ inches.

NEW ENGLAND STATES.—Three cities report a population of 265,300, with an aggregate annual death rate for the month of April of 21.72 per 1000, New Haven, Ct., showing the highest, 23.2, and Providence, R. I., the lowest, 19.0. The total number of deaths from all causes was 470, of which 51 were from zymotic diseases.

MIDDLE STATES.—(New York State reported elsewhere.) Five cities, with an estimated population of 518,775, give an aggregate annual death rate for the month of April of 18.03 per 1000. Newark, N. J., is the highest, giving 21.8; and Erie, Pa., is the lowest, giving 13.7. The total number of deaths from all causes was 941, of which 140 were from zymotic diseases. Pittsburg, Pa., reports for four weeks ending April 24th 278 deaths in a population of 200,000, showing an annual death rate of 18.07 per 1000. Zymotic diseases caused 31 deaths.

LAKE STATES.—Five cities, with an estimated population of 1,396,394, give an aggregate annual death rate for the month of April of 18.4. Highest, Chicago, Ill., 23.8; lowest, St. Paul, Minn., 11.6. The total number of deaths from all causes during the month of April was 2394, of which 429 were from zymotic diseases.

SOUTHERN STATES.—Four cities, with an estimated population of 714,035 white, and 205,260 colored, total 949,295; showing an aggregate annual death rate for the month of April among the whites of 16.76 per 1000, and among the colored 30.93 per 1000. Average rate for white and colored, 21.16. The highest death rate for the whites was in New Orleans, La., 20.26, as was also that for the colored, 34.88; the lowest death rate for the whites was in Mobile, Ala., 14.77, for the colored was in Richmond, Va., 23.63. New Orleans also showed the highest rate for both white and colored, 24.15, while St. Louis, Mo., showed the lowest, 17.16. The total number of deaths reported was: whites, 1067; colored, 546; total, 1613, of which there were 222 deaths from zymotic diseases—167 whites and 54 colored.

VITAL STATISTICS OF IMMIGRATION AT THE PORT OF NEW YORK FOR MAY, 1886.—(3) Rhaetia, Hamburgh, 219 passengers, 1 birth (1 still-birth); (4) Italy, Liverpool, 368 passengers, 1 death; (6) Wisconsin, Liverpool, 537 passengers, 1 birth; (10) Aurania, Liverpool, 654 passengers, 1 death; (12) Amerique, Havre, 309 passengers, 1 death; (13) Anchoria, Glasgow, 493 passengers, 2 deaths; (14) P. Caland, Rotterdam, 276 passengers, 1 death; (16) Etruria, Liverpool, 808 passengers, 1 death; (20) Martha, Stetten, 360 passengers, 3 deaths; Australia, Hamburgh, 520 passengers, 1 birth; (21) City of Berlin, Liverpool, 1066 passengers, 2 deaths, 1 birth; (23) Republic, Liverpool, 888 passengers, 1 death; Schiedam, Amsterdam, 259 passengers, 1 birth (twins); (24) Furnessia, Glasgow, 707 passengers, 1 death; (25) Alesia, Gibraltar, 629 passengers, 1 death; (28) Hammonia, Hamburgh, 992 passengers, 2 deaths; (29) Noordland, Antwerp, 583 passengers, 1 death; Hermann, Bremen, 754 passengers, 1 death; Werra, Bremen, 1096 passengers, 1 birth; (30) Grecian Monarch,

London, 260 passengers, 1 birth. Total: 11,778 passengers, 19 deaths, 7 births, 1 still-birth.

FOR THE PREVENTION OF INFECTIOUS DISEASES BY THE TRANSPORTATION OF DEAD BODIES.—The attention of health authorities is particularly invited to a recent law of New York on the subject, printed on another page of this number.

BROOKLYN.—*Small-pox* is creating considerable excitement in a small neighborhood chiefly occupied by Germans, among whom it appears there is a large proportion of unvaccinated persons. There have been in all (up to the time of our going to press) about twenty cases reported. From the activity displayed by the Health Department, it is reasonable to suppose the disease will be speedily stamped out. But it should be borne in mind that a ratio of even ten per cent of unvaccinated persons in a dense community is quite sufficient to invite a dangerous and expensive epidemic, and no time should be lost in house-to-house vaccination of *every person* in the district; and for protection from such outbreaks in the future, in addition to the exactions now required for admission to the public schools, special surveillance should be extended to all recent immigrants.

BALTIMORE, MD.—The Secretary of the Board of Health has made a compilation of the number of deaths annually and in the aggregate from typhoid-fever for eleven years—1875–85—1904; $173\frac{1}{11}$ per annum: *One in every* 46.5 *of the deaths from all causes.* The money value of these lives and the costs involved in their sickness and death, estimated at the usual value of lives in the prime of life—those commonly carried off by typhoid-fever—the sum squandered in this criminal mortality would have been sufficient to sewer the city.

ROCK ISLAND, ILL., has recently adopted a rigid ordinance establishing a city abattoir, and providing for the management and use thereof, and wisely placed it under the exclusive care and direction of Dr. G. G. Craig, the accomplished Commissioner of Health, and holding him responsible for its management. This is as it should be, and abundantly justified by the success with which the said commissioner has for several years administered the health service, Rock Island having

attained a degree of healthfulness, as measured by the registration reports, unequalled by any other city of its size in the United States. With a population of 11,650, the average mortality for the twelve months ending with May last has been but 9.1 per 1000.

SAVANNAH, GA., Dr. J. T. McFarland, Health Officer, reports for the year 1885: "The census of 1884 gives the population of this city, 25,720 whites, blacks and colored, 19,111; total, 44,831. The deaths in the city during the year (embracing those which have occurred at all hospitals and public institutions, seamen and all other non-residents—exclusive of accidental and violent deaths) have been 333 whites and 659 blacks and colored. Of these, 7 whites and 114 blacks had no physicians in attendance, and were furnished burial certificates from this office. Accidental and violent deaths, which were 21 whites and 19 blacks, are accounted for in full on special table of mortuary report. They are excluded for the reason that I cannot appreciate any bearing such deaths have upon the health standard of a city. The annual death ratio per 1000 of population for 1885, excluding accidental and violent deaths from the computation, is: Whites, 12.9; blacks and colored, 34.4; including accidental and violent deaths, it would be: Whites, 13.7; blacks and colored, 35.4." Aggregate ratio, 23. But the Health Officer justly protests against estimating the death rate of Savannah and other Southern cities in the aggregate, because "vital statistics show that the death rate of the negro race, in cities, all over the United States, is much greater than that of the white race, and further exhibits a fact not generally known or appreciated, which is that the death ratio of this race varies only in trifling degree throughout the different geographical sections of this country. Consequent upon this vital fact, the larger or nearer the negro population approximates to that of the whites in any city, the heavier will be the death rate of aggregated populations, and lower will be the statistical health standard, as all compilers pursue the system of consolidating race populations and deaths, the ratio therefrom being published as the criterion of health. The gross injustice and false impression perpetrated by the pursuance of this system of compilation upon cities

similarly populated as is Savannah cannot but be apparent to any just mind. With a health record for white race which compares most favorably with cities of the United States, this city is placed low on vital statistical records, below cities whose records of white mortality range much higher, simply for the reason that Savannah unfortunately has a large negro population, it being three fourths that of the whites. In New York City, with a population of 1,185,843 whites and 19,663 blacks and colored, and Boston, with 421,000 whites and 6000 blacks and colored, and other cities having large white and small black populations, the bulking of race populations and deaths does not sensibly pervert the ratio, the death rate of the negroes being lost sight of in the aggregation. Now, cite the case of the city of Savannah, with death rate for 1885—whites, 13.7; blacks and colored, 35.4; combine populations and deaths, white and black, and the annual ratio per 1000 of population appears 23.0, which will be used by compilers and published as the health standard, thus perverting the death rate of both races by lessening that of the blacks and colored 12.4, and adding 9.3 to that of the whites. Justice to Southern cities demands that vital statistics should plainly show deaths per white and black races separately, and as this Government is pre-eminently one of the white race, the standard of health should be classified therefrom."

Notwithstanding the relatively low death rate of the white population in particular, the proportion caused by zymotic diseases was unusually large: respectively, of whites, 106, or 32 per cent, and 122, or 18.5 per cent of total mortalities. Diphtheria and fevers especially predominated among the whites. Of a total of 15 deaths from diphtheria, 14 were white; and of 69 from fevers, 34 were white; 44—14 white and 30 colored—are recorded from "old age;" marasmus and inanition, 44—16 white, 28 colored; pulmonary consumption, 153; 52, or 15.9 per cent of total from all causes, white; 15.3 per cent of total from all causes, colored.

The following abstract of correspondence on quarantine, with special reference to English practice and how it should be met in this country, is worthy of the attention of all port health officers.

On the representation of the Marquis of Salisbury, October

13th, 1885, the British Minister at Washington complained to the Secretary of State of "sanitary regulations enforced at Savannah against the British vessel Sylvia, from Gibraltar, which was ordered into quarantine at that port for twenty-three days, which period was subsequently reduced to fourteen days. The European sanitary authorities, while holding to the contagiousness of cholera, acknowledge that the period of incubation of the disease is limited to some ten or twelve days, a period shorter in any case than the time it would presumably have taken the Sylvia to cross from Gibraltar to Savannah. It is contended that under the theory of the propagation of cholera by contagion, which can only justify the imposition of quarantine, it is unreasonable to refuse pratique after a voyage as long as the supposed period of incubation, or after a number of days of quarantine which, together with the time spent on the voyage, make up that period, unless cases of cholera have occurred on board, when the period of quarantine would be reckoned from the termination by convalescence or death of last case."

This communication being referred to the Health Officer, he replied :

" . . . The records of this office and the facts regarding the quarantining of the British steamship Sylvia are decidedly at variance with text of letter of complaint, and are as follows : The steamship Sylvia was not ordered by the authorities of Savannah, Ga., into quarantine for twenty-three (23) days, or for any specified number of days, consequently there neither was, nor could there have been, any subsequent reduction of quarantine detention of this vessel from twenty-three (23) days to fourteen (14) days, as stated in letter of complaint. The Sylvia arrived at the port of Savannah on September 11th, 1885. She brought clean bills of health, one from United States Consul Sprague, the other from the British official at that port, both of these bills of health bearing date August 24th, 1885.

" It was a fact known to the authorities of Savannah that cholera had existed at Gibraltar, the port of clearance of this vessel, prior to date of bills of health, even as late as August 18th ; and it is also a fact that a fatal case of this disease was reported at this port on August 28th, the latter making thir-

teen (13) cases and eight (8) deaths from cholera at Gibraltar up to August 29th, 1885.

"With these stubborn facts before them the authorities of Savannah condemned the bills of health as utterly unreliable and dangerous, and decided that, under this pressure of facts, the steamship Sylvia would not be allowed to come to the city until she, with all clothing of officers and crew, and all bedding on board, had been thoroughly cleansed and fumigated. These instructions were issued by letter from this office to Thomas Vasey, captain of said steamship, on September 12th, 1885, and he was directed to the National Quarantine Station (Sapelo Sound), distant from the port of Savannah about sixty miles. No specified detention time was either mentioned in my letter to Captain Vasey or expressed to Assistant Surgeon J. H. White, M.H.S., U.S.A., in charge of the National Quarantine Station (Sapelo Sound). Moreover, the steamship Sylvia was at the city of Savannah on early morning of September 23d, 1885.

"I deem it unnecessary to make comment in this letter; the above facts and dates are stubborn, and speak for themselves. . . .

"J. T. McFARLAND, M.D.,
"*Health Officer, Savannah, Ga.*"

He adds:

"I answered the communication which reached this office through the Marine Hospital Department, in statement of facts as given to His Honor the Mayor, and in language very similar. My official statement was returned to His Excellency Henry D. McDaniel by His Honor Rufus E. Lester, Mayor of Savannah, accompanied with the following letter:

"CITY OF SAVANNAH, MAYOR'S OFFICE, October 31, 1885.

"*To His Excellency Henry D. McDaniel, Governor of Georgia.*

"DEAR SIR: Your letter enclosing copy of a communication from the British Minister at Washington to the Department of State touching the detention of the British vessel Sylvia at the Quarantine Station came to hand.

"Enclosed I send you a copy of the report made to me by Dr. J. T. McFarland, our Health Officer, who is the Executive Officer of the Sanitary Board, which has quarantine matters in

charge. The report is full, and I hope will be satisfactory. . . .

"The minister submits that a vessel should have pratique when its voyage from the infected port has consumed as much as ten or twelve days (the period allowed by European scientists for the incubation of cholera germs) when there has been no case of cholera on board during the voyage.

"Our scientists say that cholera germs may be carried in clothing, bedding, etc., and that cholera contagion may be communicated by that means. Hence it is that the fact that sickness does not break out during a voyage, whatever may be the length of it, is not sufficient evidence that cholera may not be communicated. And hence it is that the importation of rags from the East is regulated, and their introduction into this country sometimes prohibited.

"Acting upon these views, the Sylvia was required to be fumigated and the clothes and bedding cleansed. No other conditions were imposed upon her as to detention. This requirement we believe to be a reasonable one, and we shall so maintain.

"Very respectfully yours,

[Signed] "RUFUS E. LESTER,

"*Mayor.*"

NATIONAL HEALTH SERVICE.—The Senate had passed the bill creating a Commission to investigate the efficacy of inoculation as a preventive of yellow-fever, but restricted the membership to two officers—skilled in bacteriology—already in the Government service, authorizing them, however, to employ experts—in *clinical* knowledge of the disease, we suppose, as without this no report by mere bacteriologists would be of much value. In the Senate, also, the Committee on Epidemic Diseases has reported an amendment to the Sunday Civil bill, appropriating $33,500 to pay the *expenses* of the National Board of Health.

ENGLAND.—In the 28 large English towns dealt with by the registrar-general in his weekly return, which have an estimated population of more than 9,000,000, the aggregate annual death rate for the month of May was 18.09, the lowest in the corresponding period of any year on rec-

ord. The lowest annual rate for the month in these towns was 14.2 per 1000 in Derby. In the other towns the rates, ranged in order from the lowest, were as follows: Huddersfield, 15.2; Nottingham, 16.1; Brighton, 16.4; Bristol, 16.5; Birkenhead, 16.8; Norwich, 16.9; Wolverhampton, 17; London, 17.3; Sheffield, 18.2; Sunderland, 18.2; Bradford, 18.6; Hull, 18.7; Plymouth, 18.7; Cardiff, 19.2; Leeds, 19.4; Leicester, 19.8; Salford, 20.1; Birmingham, 20.4; Newcastle-upon-Tyne, 23.9; Blackhorn, 24.2; Halifax, 24.8; Bolton, 25.2; Manchester, 26.2; and the highest rate during the month, in Preston, 28.3. While the annual death rate in London during May, as stated, was only 17.3 per 1000, it averaged 20.3 in the 27 provincial towns. The total number of deaths during the month was 13,193; 1255, or 1.8 per 1000 of population, were referred to the principal zymotic diseases, 4; whooping-cough, 424; measles, 402; diarrhœa, 143; "fever" (principally enteric), 105; diphtheria, 94; scarlet-fever, 85; small-pox, 2—1 in Liverpool and 1 in Blackburn.

In the suburban population around London, estimated at about 1,150,600, the annual death rate from all causes for the month was 14.7.

OTHER FOREIGN COUNTRIES.—From the National Board of Health and other sources, latest reports received, May 20th to July 8th, 1886, show annual death rates, in cities of over 100,000 inhabitants, as follows: Alexandria, June 3d, 43.8; Altona, June 12th, 21.4; Anvers, June 19th, 21.2; Amsterdam, June 12th, 23.3; Barcelona, June 10th, 27.2; Barmen, June 12th, 20.7; Berlin, June 12th, 26.6; Bombay, May 18th, 24.3; Bordeaux, May, 20 2; Bremen, June 12th, 21.8; Breslau, June 19th, 36.8; Brussels, June 19th, 24.9; Bucharest, June 12th, 26.5; Buda-Pesth, June 12th, 38.1; Buenos Ayres, February, 20.2; Cairo, June 3d, 42.8; Cologne, June 19th, 26.1 Chemnitz, June 12th, 33.8; Christiana, June 19th, 18.7; Copenhagen, June 15th, 20.2; Calcutta, April 17th, 21.4; Dresden, June 12th, 25.0; Dantzig, June 12th, 30.8; Düsseldorf, June 12th, 24.4; Elberfield, June 12th, 23.4; Frankford, June 12th, 21.5; Genoa, March, 36.5; Gand, June 19th, 25.8; Hamburg, June 12th, 25.9; Hanover, June 12th, 14.5; Havre, June 19th, 26.0; Königsberg, June 12th, 30.6; Leip-

zig, June 12th, 17.7; Liege, June 19th, 13.1; Lyons, June 12th, 19.3; Magdeburg, June 12th, 25.0; Marseilles, April, 42.0; Milan, March, 41.6; Madras, May 7th, 31.9; Munich, June 12th, 33.1; Nantes, May, 25.1; Nuremberg, June 12th, 30.8; Odessa, June 12th, 39.3; Paris, June 19th, 21.4; Prague, June 19th, 30.9; Rome, May 8th, 23.4; Rotterdam, June 12th, 23.6; Strasbourg, June 12th, 26.9; Stuttgart, June 12th, 23.7; Stockholm, June 12th, 20.0; St. Petersburg, June 12th, 29.2; Trieste, June 12th, 27.0; Turin, May 20th, 27.3; Utrecht, April, 29.0; Venice, June 12th, 46.5; Vienna, June 12th, 25.2; Warsaw, June 12th, 34 7.

INFECTIOUS DISEASES ABROAD.—*Yellow-fever* reported in Havana, May 6th to June 24th, from 6 to 10 cases weekly, deaths ranging from 1 to 4 weekly. In Rio de Janeiro, June 15th to 31st, 86 deaths, number of cases not reported. Georgetown, Demerara, month of April, 1 death; Montevideo, month of March, 1 death; Paramaribo, Dutch Guiana, February and March, 5 deaths (from "malignant-fever").

Small-pox reported, in Guaymas, Mexico, May, prevalent among the lower classes, 6 deaths; Buenos Ayres, March, 28 deaths; London, May 1st to June 12th, small-pox has been steadily declining in London during the past six months, and is now far below the average of the past ten years. No deaths from the disease occurred in the city during the period embraced in the report, and but 3 are reported from the large towns, 2 in Bristol, and 1 in Liverpool. During the week ending June 12th 9 cases were admitted to the London hospitals, against 10, 6 and 4 in the three preceding weeks. Bristol, May 29th to June 5th, 3 cases reported; Leith, April 10th to May 29th, reported present; Edinburgh, April 10th to May 29th, 22 cases and 2 deaths; 5 cases remained in hospital; Paris, April 25th to June 19th, 37 deaths; June 12th there were 55 cases under treatment in hospital, against 83 May 1st; Bordeaux, April 1st to June 5th, 14 deaths; Havre, May 29th to June 5th, 1 death; Marseilles, June 3d to 10th, 32 deaths. Consul states that "there is a marked decline in the number of cases and deaths from the disease." Nice, April 1st to May 31st, 8 deaths; Rheims, April 25th to June 12th, 148 cases and 36 deaths; disease increasing; Rome, May 2d to

8th, 10 deaths; Prague, June 13th to 19th, 6 deaths; Milan, month of March, 10 deaths; Buda-Pesth, June 6th to 12th, 12 deaths; Genoa, April 17th to June 12th, 106 cases and 23 deaths; Trieste, April 17th to June 5th, reported present; Leghorn, April 25th to June 13th, 46 cases and 3 deaths; Brussels, June 13th to 19th, 3 cases; Zurich, April 17th to June 5th, 21 deaths; Bremen, May 15th to 22d, 1 death; Prague, May 6th to June 24th, 41 deaths; Warsaw, May 29th to June 5th, 1 death; Riga, Month of April, 1 death; Colombo, Ceylon, May 1st to 8th, prevalent among the natives.

Cholera reported in Venice, April 25th to June 12th, 347 deaths, number of cases not reported. The deaths from the disease during the six weeks embraced in the report were as follows: 21, 39, 45, 23, 85, and 134. Calcutta, March 27th to May 22d, 170 deaths; Madras, April 10th to 16th, 1 death; Singapore, month of April, 2 deaths; Sydney, Australia, March, 1 death in suburbs; London, May 1st to June 12th, 1 death. Latest telegraphic reports to time of going to press: Rome, July 9th, 1886. The cholera returns for to-day are—Brindisi, 127 new cases, 78 deaths; Latiano, 52 cases, 22 deaths; Fontana, 47 cases, 41 deaths. Minister Grimaldi is visiting and succoring the sufferers.

Alexandria, July 9th, 1886. Full quarantine has been ordered against all arrivals from Austria and Italy because of the increase of cholera in Italy.

Diphtheria, scarlet-fever, and measles reported in Stockholm, June 6th to 12th, diphtheria prevalent, 16 deaths reported; Trieste, 61 cases, 23 deaths; Riga, April, 10 deaths; Amsterdam, April 5th to 12th, 8 cases and 4 deaths from diphtheria; Paris, June 13th to 19th, 25 deaths from measles, 16 from scarlet-fever, and 28 from diphtheria; Rotterdam, April 10th to May 8th, measles and scarlet-fever prevalent. During three weeks ending April 17th, May 1st and 8th, there were 163 cases and 7 deaths from measles, and 38 cases and 1 death from scarlet-fever. Berlin, June 6th to 19th, 13 deaths from measles, 6 from scarlet-fever, and 12 from diphtheria; Barcelona, April 1st to June 10th, diphtheria prevalent, 71 deaths reported; Riga, April, from diphtheria 10. The Minister of the Interior reports as follows concerning small-pox, scarlet-

fever, and diphtheria in Italy during the month of February last: small-pox, 2637 cases and 343 deaths; scarlet-fever, 861 cases and 175 deaths; diphtheria, 2414 cases and 1015 deaths. Small-pox was reported in 157 towns."

Fevers reported in Matanzas to June 23d: Since May 19th typhoid-fever has been prevalent; 32 cases and 12 deaths. St. Thomas, D. W. I., June 1st to 21st, intermittent- and remittent-fevers prevalent, 54 cases reported. Also mild form of intestinal catarrh and acute diarrhœa, 33 cases reported.

YELLOW-FEVER INOCULATION.—Dr. Domingo Freire, of Rio de Janeiro, in a recent letter to Dr. Joseph Holt, of New Orleans, writes:

"I have performed over seven thousand inoculations with full success. The immunity was almost absolute, notwithstanding the intensity of the epidemic this year. More than three thousand persons who were not inoculated died of yellow-fever, while among the seven thousand inoculated inhabiting the same infected localities, subject to the same morbid conditions, but seven or eight individuals whose disease was diagnosed as yellow-fever died. My *confrères* here have the careless habit of not giving notice of the fact until after the interment of the individuals, and, consequently, accuse me of being unsuccessful. You will therefore see that in spite of all this bad will my doctrine comes out victorious once more by the test of the year when the epidemic characterizes itself by energetic intensity of infection and contagion."

LITERARY NOTICES.

A MANUAL OF DIETETICS. By J. MILNER FOTHERGILL, M.D., Edinburgh, Physician to the City of London Hospital for Diseases of the Chest (Victoria Park). Hon. M.D. Rush, Medical College, Chicago, Ill., Foreign Associate Fellow of the College of Physicians, Philadelphia. 8vo, extra muslin, pp. 255. Price, $2.50. New York: William Wood & Co.

This work comprehends the systematic arrangement of much excellent material which has heretofore been contributed through various channels, together with important valuable additions, by this distinguished authority in this branch of

medical education. It differs from most other works on dietetics in so far as it gives special attention to the *preparation* of foods as well as physiological properties, and to their special adaptations to the different periods of life and particular conditions of the system in health and disease. While there is no attempt at classification of foods, there is instead a practical grouping of those which are analogous in properties from both kingdoms, based upon a knowledge of their physiological effects. It comprises such knowledge as every medcal practitioner and every intelligent nurse ought to possess.

THE MEDICAL REGISTER—NEW YORK, NEW JERSEY, AND CONNECTICUT, 1886-87, twenty-fourth volume—contains the names of 6800 physicians, as follows: New York State List, 2884; New Jersey State List, 824; Connecticut State List, 527, an increase of 190 since preceding issue. The New York City List, 1926—increase 24; Brooklyn, 639—increase, 41. Total increase in the three States, 255. In the city of New York 20 have died during the year.

As usual, besides the catalogue of physicians, their removals, changes, etc., there are lists of pharmacists, dentists, veterinary surgeons, and nurses; medical and other society associations; hospitals, dispensaries, colleges, libraries, vital statistics, meteorological statistics, street directory, ferries, etc., greatly facilitating the movements of physicians and their allies, and all who would have anything to do with them. The matter is arranged and the volume gotten up in the convenient and excellent manner common to the editor, Dr. William T. White, and the publishers, G. P. Putnam's Sons, New York.

THE NEUROLOGICAL REVIEW, Vol. I., No. 1, May, 1886, issued monthly, edited by J. S. Jewell, M.D., sixty-four pages, octavo, is a new periodical, which will doubtless speedily obtain the liberal patronage which the reputation of the editor fully justifies. "Clinical Contributions to the Treatment of Epilepsy," by the Editor, and "Paranoia," by J. G. Kiernan, M.D., are the leading papers, with editorial and review departments well stocked with practical subjects, show a propitious beginning. $3.00 *per annum.* Chicago: Rand, McNally & Co.

THE SANITARIAN.

AUGUST, 1886.

NUMBER 201.

THE NOMENCLATURE OF SANATARY SCIENCE.

LANGUAGES are but the expression of the manners, the tastes, the genius of the people who use them, and they change to keep pace with the improvement of society. Algarotti says: "Il genio della lingua è propiamente l'espressione del genio nazionale." They are developed from internal resources, but may be improved and rendered more copious by appropriating terms from other languages. Priestley, in his lectures, says: "No internal constitution can preserve a language from general revolution" (Lecture XV., "Revolutions of Languages"). But these changes should always be in conformity with the spirit and the analogy of the language adopting them. The same author remarks: "The more constant are its principles, the more it is of a piece with itself, the more commodious it will be for use."

The Greeks took even their alphabet from the East, and at different times, but the changes made in all they appropriated were so radical that they formed from them a symmetrical language, having within itself all the elements of future development.

Bosworth, speaking of the early Saxon, compares it with the Greek, and shows in it the same tendency: "It impregnates the innumerable strangers entering its dominions with its temper and stains them with its color, not unlike the Greek, which, in taking up Oriental words, stripped them of their foreign costumes and bid them appear as native Greeks."

The Romans changed the terminations of all the nouns they adapted from the Greek and treated them as genuine

Latin words; but the later poets, in the decline of the language, with an affectation of erudition, preferred the Greek terminations which Cicero and the writers of the Augustan age had rejected.

As changes are taking place, many serious abuses are creeping into the language which the lover of English literature can do much to prevent. No writer of correct taste can sanction the use of such barbarous terms as *sanitarium*, *sanitorium*, sani*tory*; they are like *scarlatina*, which Webster calls a "barbarous Italian word with a Latin termination."

N. P. Willis has been no less unfortunate in forming such uncouth and vulgar expressions as *unletupable*, *plumptitude*, *wideawakeity*, and the like. New terms are admissible when required, but they should be formed in accordance with the spirit of the language that adapts them. The words cited are not Latin, nor are they English; they are excrescences on the language, which are neither useful nor ornamental. The expressions from Willis have a rickety character, and as the elements are decidedly English, they may be considered congenital; the Latin words are as awkward as an anchylosed dislocation.

This abuse of the language is not of recent date. Robert Golding, who wrote in 1560, complaining of the too free introduction of classical terms in his day, says:

> "And were we given as well to like our own,
> And for to cleanse it from the noisome weede
> Of *affectation*, which hath overgrowne
> *Un*graciously the good and native seed,
> As for to borrow where we have no need."

Surely the language of Milton, Pope, and Wordsworth, of Addison, Swift, and Johnson, of Burke, Pitt, and Sheridan, need not ask alms of its neighbors. But we are constantly asking alms, and, to proclaim our poverty, we refuse to allow the foreign coins to be stamped in our mint. Harris, in his "Hermes," says: "We Britons in our time have been great borrowers, as our multiform language may shew;" and having named the sources whence they borrowed, he continues: "These many and very different sources of our language may be the cause why it is so deficient in regularity and analogy."

Walker emphasizes the same thought: "This difference (in pronunciation) has no regard to analogy. . . . That so clear

an analogy of our own language should be subservient to the capricious usages of the Latin is a satire upon the sense and taste of Englishmen. . . . The English are fond of appearing in the borrowed robes of other languages"—the reverse of the Greeks, who "stripped Oriental words of their foreign costumes, and bid them appear as native Greeks."

The English is sufficiently copious, but its words have been drawn from so many heterogeneous sources that it is extremely complex in its composition; in fact, the language has been embarrassed by the importation of foreign terms when we had words of our own sufficiently clear, forcible, and harmonious. Similarly perplexed, the brilliant Philarète Chasles, in his "Essays on the French Language," asks, "What course should be pursued between (what he calls) *neologism* and *puritanism* in language? Where is the dividing line between rational liberty and unjustifiable license to be drawn?" *

Can a foreign word become purely and idiomatically English? What conditions are necessary to make it such? Who will be our authorities to guarantee its purity? Will they be the class described by Pope:

> "The bookful blockhead, ignorantly read,
> With loads of learned lumber in his head"?

Will they be the conceited pedants so often alluded to by Walker, Johnson, and others, who are always claiming precedence for Latin over English usage? Or will they be the careful philologist who has traced the growth of the language through its many and varied elements of confusion; who has carefully considered its analogy with the idioms that have exerted more or less influence on its formation; who is not carried away by enthusiasm for the ancients, but is willing to admit that, under reasonable conditions, foreign words may become naturalized and form a part of a harmonious whole? There are many compounds already in the language, such redundancies as "periphery," from the Greek, and "circumference," from the Latin, to express essentially the same thing; "overplus" from English and Latin; *sur*charge and *sur*pass from French and English, which do not challenge criticism, A Latin preposition is transformed into a noun, as "an ultra," but we cannot say "a beyond."

* Mais quel parti prendre entre le néologisme et le puritanisme du langage? Quel ligne sépare les libertés permises des licences que vous condamnez.

Why say "to impart honor," while an impartible estate is one that cannot be divided (Blackstone); *im*polite, but *un*polluted; *im*ploring and *un*imploring; *un*nerve, to deprive of nerve or strength, as to *un*nerve the arm (Addison); *in*nerve, to give strength to (Dwight); *in*nerving, a strengthening, and *in*nervation, a weakening of the nerves? Should we say *in*spirited or *un*spirited; *in*titled, *en*titled, or *un*titled; *in-* or *un*scientific, *in*case or *en*case, and, if we want the negative of hygienic, should we say *in*hygienic, *un*hygienic, *non*-hygienic, or must we go back to the Greek roots and make it *a*hygienic or *an*hygienic, like *a*cephalous, *a*morphous, *a*nomalous, *an*hydrous?

Sanitary is the word that most frequently challenges criticism; and the fact that it enters so generally into the literature of hygiene is sufficient reason for an inquiry into its orthography. San*i*tary is not English unless ignorance of its derivation and a depraved taste can succeed in giving it the place that properly belongs to san*a*tary. It is generally said to be from the root *sanus*, an adjective which, throughout all its inflections, has *a* in all proper cases, never *i* in the second syllable. Mens s*a*n*a* may be cited, so san*a*m and san*a*rum. Sano is sometimes referred to as the root. The verb has *a* long in the increment, which, of course, it retains through more than sixty inflections. There is no adjective san*a*tarius nor substantive san*a*tarium from which the English word san*a*tary can be derived. Sanator is low Latin, but san*a*tio, san*a*bilis, insan*a*bilis, etc., show plainly what form analogy would give it. San*i*tas is not a primitive nor the root of anything; it is itself an exceptional form because sānātās, three long vowels in succession, would be disagreeable. The short I was substituted for the long *a* in the penult, making san*i*tas, like veritas and caritas, a short vowel between two long ones. The *i* is, therefore, no essential part of sanitas; it is merely a euphonic change, like *in* into im or *il* before cognate letters, and no theory of derivation can force it into the derivatives in English.

The English lexicographers very correctly have san*a*tary, san*a*ble, san*a*bility, san*a*bleness, and *in*san*a*ble, insan*a*bility, etc. Sanity and *in*sanity, from sanitas, and insanitas are the only forms having *i* in the penult.

Walker, discussing the pronunciation sănăble, covers in-

directly the whole ground of the orthography of these derivatives. He pronounces the *a* short in both syllables, and continues: "Mr. Nares, Buchanan, and W. Johnston pronounce the *a* in the first syllable of this word long, but Mr. Sheridan, Mr. Scott, and Entick, more properly, short. Buchanan only makes the same *a* in san*a*tive long; but Mr. Sheridan, Scott, W. Johnston, Perry, and Entick, short. Mr. Sheridan and Buchanan are the only orthoepists from whom we can gather the sound of this vowel in insan*a*ble." Here are eight recognized authorities on lexicography differing in regard to pronunciation, but all agreeing about the orthography of the words. Subsequent writers, as Webster, Worcester, and others, have given the same spelling. In san*a*tion Walker makes the first vowel short and the second long; in sanativeness the vowels have the same quantity as in sănăble. Like sanable, Walker gives "tenable from the French tenable, Latin ten*a*bilis," and says, "the word able is annexed at pleasure to mere English words, as pleasurable, pasturable."

The French have sain, santé, san*i*taire, from which san*i*tary must be derived, if it be considered English contrary to the usage of the best authorities. They have no compounds with *in* and sain, consequently we cannot go to them for *in*san*i*tary. Malsain is *un*healthy, as *in*salubre is *un*san*a*tary. For *in*sane they have *fou* and *folle*.

The Spanish has, by contraction from the Latin word s*a*n*a*re, s*a*n*a*r, and, as derivatives, san*a*ble, insan*a*ble, etc. The Italian has san*a*re, san*a*bile, insan*a*bile. The Portuguese, san*a*ble, insan*a*ble, and the Roumanian, san*a*tosi, sănătătii. One of two conclusions is inevitable: san*a*tary is from the Latin, san*i*tary from the French. The purists may take either horn of the dilemma.

What reason is there for altering the orthography of words long in use, sanctioned by the best English authorities and in accord with the primitives? English usage does not require it. Changes of this kind are never made by scholars. Those who substitute *i* for *a* in san*i*tary should be consistent and write san*i*bility, san*i*bleness, san*i*ble, san*i*tion, sanitive, sanitiveness, and prepare a new and corrected edition of the standard dictionaries, into which they can introduce all the vulgarisms in common use.

Latin and Greek prepositions and prefixes are now indis-

pensable in English. Five are inseparable, and have become children of adoption. They are used as English words without any regard to their origin or derivation.

According to Webster, *in* is a "prefix used in composition, as a particle of negation, like the English *un*, of which it seems to be a *dialectical orthography*."

In belonged to the Saxon, as it did to the Danish, the Swedish, and other Teutonic dialects in the earliest times. About the year 800, two and a half centuries before the Norman conquest, it is found in the Lord's Prayer, as: "Uren Fader thic arth *in* heofnas . . . sic thin willa, suc is *in* heofnas, and *in* eortho . . . and do *in*lead usith *in* custnung."

In was then used as it is now, *in* heofnas and in the word *in*lead, the prefix was negative. Other changes are remarkable, as h*eo*fnas for h*ea*ven.

About the year 890 *in* was replaced in some cases by *on*, as: "Fæder ure thu whe eart *in* heofenum . . . gefurthe thin willa *on* eorthan, swa swa *on* heofenum . . . and ne gelædde thu us *on* costenunge."

In the later Saxon period we find another change: "Our Fadir that art in hevenys. . . . Be thi wil *in* erthe, as *in* hevene. . . . And forgive to us our dettis, as we forgive our dettouris, and lede us not *into* temptation, but delyvere us from yvel."

There are in English about 8552 words beginning with the prefixes *in* and *un*. Those beginning with *in* may be divided as follows: With *ig*, 15; *ir*, 77; *il*, 99; *en*, 305; *em*, 754; *im*, 794, and *in*, 2623, making 4667. Those in *em* and *en* make 1059, about 795 of which are undoubtedly French, and 264 have varying claims to Latin or French origin. Those in *im* and other forms are more than half traceable directly to the French, as, *ig*norance, *ir*ritable, *il*lusoire, *im*becile. Of those in *im*, as *im*bitter, 172 are English, in *in*, 392, making 564 distinctly English, which, with 1898 clearly French, make 2462 not Latin, and 2207 having more or less analogy with the Latin. About thirteen per cent are English, thirty-eight per cent French, and five per cent Greek and other modern dialects, making fifty-six per cent not Latin and forty-four per cent having more or less claim to a Latin origin.

There are 3885 which have the prefix *un*, of which 2001 are with Latin roots, or French traceable to Latin, and 1884 are

English. This statement includes all the roots and their derivatives. A more correct analysis would be to compare only the roots or primitives, but the labor of separating would have been very great.

Many anomalies have been introduced into the language with the use of *in* and *un*, as in *un*rip, which means simply to *rip*; so *un*loose may be called a barbarous redundancy. *Un*expressive is not simply made negative; it is changed from active to passive, and Walker says: "The Latin *in* and the English *un* are sufficiently ambiguous without such unmeaning licenses, which were introduced when the language was less studied, and perhaps merely to help out a hobbling line in poetry." A remarkable example of their early usage is found in Ovid's line:

"Non est habitabilis æstu."

If habitable signifies capable of habitation, *in*habitable ought to signify *in*capable of habitation; and Sandys, in his annotations on Ovid's "Metamorphosis," writes: "The frigid zone held *in*habitable of extremitie of cold." In his time *in*habitable had the same signification that *un*inhabitable has now. Again, mortal and *im*mortal are opposed to each other, and *un* prefixed changes the meaning of *im*mortal to mortal:

". . . *un*immortal made
All kinds."

Milton's Paradise Lost, b. x.

Another form of comparison will give a clearer view of the analogy of the language.

The gender of French nouns is determined by the termination. From the "Dictionary of the French Academy," ten of these give 5489 words, nearly all of which become English by a slight change of termination; thus there are 1018 ending in *tion*, which are unchanged, as lotion, nation; 604 in *té*, which is changed into *ty*, and 895 in *eur*, which is changed generally into *our*, as super*ieur*, super*iour*. True, most of the words ending in *our* have been contracted into *or*, but this change had no influence on their derivation. The nouns in general use, in French, are about fifteen thousand, of which more than two thirds, or ten thousand, have become English by slight changes in the orthography.

Shaw, in his "History of English Literature," says: "The Latin words, which constitute three fifths of our language,

cannot, in any instance, be proved to have derived their origin from any corrupt Latin dialect spoken in Britain, but to have been filtered, so to speak, through some of the various forms of the great romance speech from which French, Italian, and Spanish have been derived."

Johnson says that the language of the thirteenth century and of subsequent periods was neither Latin nor English. "Before the time of Queen Anne every writer adopted what words he thought proper from foreign tongues. Only a small part of them have since that period been in use; but they are now perfectly incorporated with the language, so that the words that were in use in the age of Elizabeth and the reign of Queen Anne can hardly be called foreign, whatever may have been their derivation."

The English *un*, the German *un*, and Danish *u* are, for the Saxon race, the natural expression of their thought, and, with the derivatives from *sane*, are as thoroughly English in their spirit and composition as the great majority of the words in the language. The Germans say *un*gesund, the Danes *u*hegelig, and the English naturally u*n*san*a*tary as they say *un*healthy.

In, as a prefix to *sanus*, refers to mental diseases. "*Insanus* is not, or was not, by the Romans applied to general health, and its restriction to mental phenomena is not arbitrary, but fully warranted. *All the compounds* of *in* and *sanus* refer to *mental* phenomena, and *never to physical.*"

Grysar, in his "Theory of Latin Style," Cologne, 1831, says: "Insanus was never used by the best writers when referring to bodily diseases, but was restricted to mental phenomena. Physical diseases were expressed by the adjectives *infirmus, æger, ægrotus.* Still less did it refer to unhealthy atmosphere, *ær insanus*, but, on the contrary, we say *ær gravis, cœlum grave, cœli gravitas.*" Compare also Krebs and other commentators. And Cicero, defining the word, says: "Eos sanos intelligi necesse est quorum mens motu quasi morbi perturbata nullo sit; qui contra affecti sunt, hos insanos appellari necesse est." Scores of passages can be cited from Cicero and other writers, and especially from the "Tusculan Questions," in which the word is arbitrarily restricted to mental phenomena, but *not one* in which it is applied to general health. Celsus, "De Medicina," has not

used the word insanus; he employs the word insania and other derivatives about two dozen times, and in only one passage can it be referred to general health; and there it is used by pleonasm, and has really no force" (THE SANITARIAN, Vol. IV., p. 95).

Formal and scientific definitions, even of scientific terms, do not suit the purists; they prefer figurative expressions from the poets, which they interpret literally: thus "montes insani" does not mean very high but very sick mountains.

> "Sacred interpreter of human thought,
> How few respect or use thee as they ought."—*Cowper.*

In a paper on "Sanitary Nomenclature," by Dr. Ezra M. Hunt, read before the American Public Health Association (THE SANITARIAN, Vol. XVI., p. 142), it is well stated that "so much misconception comes from a loose or indefinite use of terms that we cannot be too careful to have classifications which shall have right foundations and be well understood."

The various theories regarding the nature of diseases and the best method of classifying them have been the cause of great uncertainty and, at times, of very warm discussion, from the time of Hippocrates to that of Virchow, who has taken great credit to himself for overthrowing the theories of the Humoral Pathologists, and, as he claims, establishing on the ruins the foundations of the Cellular Pathology. There has been, and is still, connected with this subject more confusion than is found in any other art or science. "Any one," says Dr. Hunt, "who will examine the various standard authorities either on lexicography, epidemiology, practice of medicine, or hygiene, will soon perceive the want of uniformity of meaning and of distinction in use." Geology, botany, zoology, and chemistry have fixed principles and settled terms for each branch and subdivision of the science. Medicine and hygiene, in particular, still remain "rudis indigestaque moles." In view of the opposing opinions held by theorists regarding the classification of diseases, the struggle seems still

> "Humantia siccis,
> Mollia cum duris, sine pondere habentia pondus."

Different authors make different classifications of diseases, and each modifies the meaning of the terms in common use, so as to adapt them to his system of nosology; the result is

irreconcilable differences in the use of terms and endless confusion regarding the things designated.

"Nemeyer, under acute infectious diseases," remarks Dr. Hunt, "has typhoid-fever, small-pox, intermittent-fever, and speaks also of the miasmatic origin of typhoid, cholera, trichiniasis, glanders, and syphilis. . . .

"The last English statistical nomenclature uses the term miasmatic to denote what it calls 'specific febrile diseases or zymotics,' and includes small-pox, measles, epidemic rose-rash, scarlet-fever, influenza, whooping-cough, mumps, diphtheria, cerebro-spinal-fever, simple continued-fever, and other miasmatic diseases. Surely there is no basis for an intelligent nomenclature in the use of this term for all these diseases."

This is not, in the closing years of the nineteenth century, a very encouraging view to take of a scientific question of so much importance to the public; but Dr. Hunt has foreshadowed a prognosis as gloomy as the one he so bitterly bewails: "For our advances in a knowledge of etiology it is certain that any such nosology must be held as a convenient working form subject to decennial or more frequent revision."

The nomenclature of sanatary science has fared no better than the nosology, for, as each writer has adopted such a classification of diseases as pleased him, so each has selected the terms with which to describe them, according to his caprice or his knowledge of the subject, and of this class Scaliger has said: "Nihil infelicius definitore grammatico."

Dr. Hunt quotes as his authorities Worcester, Bacon, Farr, Dunglison, and the "English Reports." None of these has any weight as an authority on the nomenclature of hygiene. For classical terms and roots of words he has drawn principally from Dunglison, whose book is a mere compilation from older works, principally French. It is superficial, and has copied erroneous as freely as correct derivations without attention or discrimination.

The title "Sanitary Nomenclature" is unfortunate, as are also the titles of the subdivisions, "Statistical Nosology" and "Parasitic Nomenclature of Disease." Parasitic is, in reference to classes under it, a generic term, and as what is predicable of the essential attributes of the genus is also predicable of the essential attributes of the species, it follows that, if parasitic nomenclature is an attribute of disease, mangy

nomenclature, scabby nomenclature, pedicular nomenclature, are equally appropriate attributes. Nomenclature of Parasitic Disease is suggested as a substitute for "Parasitic Nomenclature of Disease."

"Sanitary Nomenclature," for a similar reason, is of more than doubtful propriety. Sanatary means tending or adapted to guard public health. Salubrious and salutary also mean promoting health, public or private, and may be construed in the same way, so that it will be equally proper to write: Sanatary Nomenclature, Salubrious Nomenclature, or Salutary Nomenclature; and if sanatary is predicable of nomenclature, so is parasitic and other terms.

Dr. Hunt suggests that "where either of the words (contagious or infectious) are now used in the more general sense, the good English word communicable may be well substituted." This will depend on one of two conditions—on the manner in which diseases are communicated, or on the similarity or dissimilarity in the meaning of the terms which it is proposed to use as synonymous. Infectious and contagious are evidently active in signification, while communicable is passive.

Whether it would be desirable or not to banish the term zymotic from our nomenclature, as he suggests, cannot well be decided until the nature of the disease or class of diseases to which it is applied is fully determined.

Medical terms are derived from the Greek or Latin directly or through the medium of other languages having a closer analogy to these ancient sources than the English, or they are adopted from the various idioms in which they are used.

Greek derivatives are the most numerous, in consequence of the great flexibility and copiousness of that language. Hygiene is so commonly used in English to express health and its relation to sanatary regulations, that it can hardly be considered a foreign word. The different ways of spelling the word should be avoided, as no good can possibly follow such a variety. It is true they are imitations of the Greek, but when that language was spoken each form had its special application. The Germans have used nearly every one of the derivative terms, and with the very best results, giving to their technical language copiousness and precision. The French, from which the English take the word hygiene, as they do

nearly all their technical terms, do not wait for the slow process of assimilation, but change them at once, so as to make them an integral part of their language, as fully as if they had been in use for centuries. This is the more observable because they give nouns different genders according to their terminations, and adjectives are varied in termination so as to agree with the terms to which they are applied, in gender and number. Thus they are at once lost in the class to which they belong, and their foreign origin is forgotten; whereas in English they stand inflexible, and constantly remind the reader that they are strangers in the language until by long use the eye and the ear become familiar with them, and their foreign extraction is forgotten.

Dr. Hunt states that the diversity of spelling the word hygiene "could not have occurred had its derivation from the Greek 'Ὑγιαινω,' 'I am in good health,' been kept in view." The fact that the Greek verb expresses the complex idea conveyed in the phrase, "I am in good health," shows that it comes from a more simple root, or, as the lexicons call it, *theme*. Scrivelli, Donnegan, Pickering, Liddell and Scott, and others give Ὑγιής, *sanus*, healthy, as the root. The French took it directly from Ὑγιεινός, healthy or conducive to health, *sanus, saluber*. The Ὑγιής, and the fact that the use of the word, in its modern application, is referred to Paré, strengthens the other proofs that hygiene is copied directly from the French word *hygiène*. The motto on the Parkes medal, spelled with the obsolete iota, has no bearing whatever on the derivation of this word.

Hygiology is a good word, but it is not new, and referring its origin to Dr. Farr is like referring hygiene to Ambrose Paré. The vocabulary of the Germans, taken from Latin and Greek sources, is far richer than the English, and bears all the evidence of sound scholarship. They have pressed into service nearly every term in use among the ancients, and, unlike the English, they have given to each a definite and fixed meaning. Gabler, in his Dictionary,* gives the word hygiologia, "die Lehre von der Gesundheit," with many others from the same root, and among them Hygiocomium, a place

* Lateinisch-Deutsches Wörterbuch für Medicin und Naturwissenschaften, bearbeitet von Dr. Ernst Gabler, Prakt. Arzt in Berlin. Berlin, 1857.

for convalescents. From the same source the Spaniards have the word manicomium, a retreat for the insane, and from the same theme the French have formed hygi*éni*que, hygi*éni*ste, and many other words which the English will no doubt appropriate in time.

It may be observed that every nation, in forming new words from the ancient languages, adapts them to the genius of its own idiom; thus, the Italians have Ig*iene*; the Spaniards, Hig*iene*; the Poles, Hyg*ien*ie; the Danes, H*yg*iejn*i*ske; the modern Greeks, or Romaic, like the ancient, Ὑγιής, Ὑγεία, Ὑγιαίνω, etc.

In forming the term zymotic, from "ζυμος, a ferment," attributed to Dr. Farr, some one has blundered egregiously, and, no doubt, through carelessness, in copying from others, for there is no such word in Greek. Probably ζυμη or ζυμωτος was meant. The French give "zumé ou zumoma, remplacé par zymo" as the Greek roots.* The facility with which the roots yield to the necessary changes demanded by the French, shows the plastic nature of the element and the skill of the artist in moulding it, so as to make a symmetrical language without injury to the original. In this way they readily form such words as zym*olo*gie, zym*olo*gique, zym*oti*que, from which, with the usual change of final *que* into *c*, zymotic is formed; they have in good use also antizymotique.

The *Siglo Medico* for January 3d, 1886, has an article entitled, "Apuntes de Vacunalogia," by Antonio Sierra y Carbó, ex-Director del Instituto de Vacuna de Puerto Rico. Vaccinology will become as useful and as appropriate a term as hygiology, unless the Latin *purists* object to affixing a Greek to a Latin word.

Other European languages have appropriated Latin and Greek words, and moulded the terms to suit their own convenience. There are in German about one hundred and seventy medical terms having the prefix *in*, of which forty or more are Latin compounds; but even these have frequently German words annexed, as *in*cisionsmesser, *in*jectionsspritze. There are about eighty in *un*, of which twelve are Latin and one Greek, but these have German endings, as: *un*förmigkeit. So the Danes combine the terms in accordance with their own usages, as: *ind*occulire, *ind*plante, so: *u*naturlig, *u*personlig.

* Dictionnaire Analogique de la langue française, par P. Boissière.

Is the English, the only language in the world spoken by any people, barbarous or civilized, that is forever doomed by the purists who use it as their native tongue, that in which they lisped the first words of parental affection, in which they made known the wants of childhood, forever to pay tribute to foreign sources? Are the English-speaking people never to claim that freedom of thought and of expression which their Saxon brethren on the Continent have ever held as their birthright? Must they forever lisp in hybrid phrase to please the dilettanti, and speak a hybrid tongue, in order to preserve the purity of words taken from a dead language which they cannot alter? Shall *I* and *U* forever play the part of the roses in the wars of the Plantagenets?

Bishop Gardiner, in a letter to Chike, mentions a witticism of Nicholas Rowley, a fellow Cantab. with him, which shows the absurdity of the claims made by the purists:

"Let handsome girls be called v*i*rgins and plain ones v*u*rgins."
"Si pulchra est v*i*rgo, sin turpis v*u*rgo vocetur."

This, Elphinstone thinks may be modernized by the aid of a far more celebrated line:

"Sweet virgin can alone the fair express,
Fine by degrees and beautifully less;
But let the hoyden, homely, rough-hewn v*u*rgin
Express the homage of a Major Sturgeon."

The keen satire of David Garrick was pointed, no doubt, at the Latin purists when he wrote the following witty reply.

Dr. Hill published a pamphlet in which he presented a petition from the letters *I* and *U* to David Garrick, Esq., both complaining of terrible grievances imposed upon them by that great actor, who frequently banished them from their proper stations, as in the word v*i*rtue, which they said he converted into v*u*rtue, and in the word *un*grateful he displaced the *u* and made it *in*grateful, to the great prejudice of the said letters.

To this complaint Garrick replied in the following epigram, given in Murphy's life of the actor:

"If it is, as you say, that I've injured a letter,
I'll change my note soon, and I hope for the better;
May the right use of letters, as well as of men,
Hereafter be fix'd by the tongue and the pen.
Most devoutly I wish they may both have their due,
And that *I* may be never mistaken for *U*."

BROOKLYN, August 2, 1886. T. P. CORBALLY.

THE PENNSYLVANIA SANITARY CONVENTION.

HELD IN PHILADELPHIA, UNDER THE AUSPICES OF THE STATE BOARD OF HEALTH, MAY 12–14, 1886.

WILLIAM PEPPER, M.D., LL.D., President of the Convention, opened the first day's session, and introduced Hon. Robert E. Pattison, Governor of the State, who delivered an address characterized by a comprehensive appreciation of the public health service, and the usefulness such conventions as this promised to be for the education of the people.

Dr. Benjamin Lee, Secretary of the Pennsylvania State Board of Health, read a paper on "An Epidemic of Diphtheria Traced to its Source in Pittsburg, in 1877," which afforded a painful lesson of municipal and domiciliary negligence in regard to filth disposal. A hill-side sewer which was practically the ventilating shaft of a number of dwelling-houses with untrapped plumbing fixtures was so badly constructed and neglected as to have become choked with filth. The emanations from this filth in process of putrefaction had the usual result of poisoning the people.

Rev. G. D. Stroud, in discussing Dr. Lee's paper, thought that in view of such conditions all sewerage should be done away with, and earth closets and cremation substituted. He evidently contemplated that such substitutes would be so perfect in all their adaptations as to meet requirements which no knowledge of their practical application hitherto justifies.

Dr. Carl H. Horsh, of N. H. State Board of Health, read an instructive paper on the "Necessity of Physical Education."

Dr. Henry F. Formad, of Philadelphia, read a paper on "Tests for Organic Impurities in Water," referring to the special dangers of impurity and the unreliability of chemical tests. The presence of bacteria in water was evidence of organic impurity, and the number of bacteria a relative measure of the amount of organic matter present. Hence he recommended as the best test the use of culture substances which would show relatively the quantity of organic matter

present by the number of bacteria and rapidity of their development. He admitted, however, that injurious organic matters might be present without the presence of bacteria.

Dr. F. S. Wilson, Lazaretto Physician, Philadelphia Board of Health, read a paper on the "Importation of Foreign Rags," taking the ground that rags are so liable to infection that they ought to be reduced to pulp (in process of paper-making) before shipment.

Mr. William Taylor, of Boston Board of Health, stated that no rags were admitted in Boston without disinfection under the supervision of the Board of Health. The method adopted was by superheated steam to the rags in bale, which had been found satisfactory.

Dr. A. N. Bell, of New York, considered rags the most dangerous of all articles of commerce, insomuch that up to the practical application of superheated steam to rags in bale they were considered so foul that no effort was made to disinfect them. They were, when known to be from infected places, subjected to detentions at our ports of entry, or kept in special store-houses for indefinite periods of time, and then allowed to proceed fraught with consequences painfully familiar to all who have taken the pains to follow them. He said that it was now the practice of Great Britain to prohibit the landing of rags coming into her ports from cholera-infected countries like Spain, Italy, France, Japan, and the East Indies, while they were permitted immediate clearance for American ports, thus stimulating the misrepresentations of the importers in this country that such rags are cleared from healthy ports, though they well know them to have been collected and baled in infected places. He referred in particular to the prevalence of small-pox at almost every seaport of and throughout Japan during the last year, and to cholera in some of her principal seaports during the last six months; notwithstanding, certain rag importers and paper-stock dealers in New York and Boston had made themselves notorious by their efforts to evade quarantine restrictions for the protection of the public health. Owing to the uncertainty of the prime sources of foreign rags, regardless of the ports from which they may have last been cleared, and the well-known unreliability of the pretended measures used for their purification before shipment to this

country, Dr. Bell favored the disinfection of all foreign rags on arrival at our ports as the only reliable means of safety. He was in favor of the disinfection of rags in bale by the superheated steam process as now practised in Boston, because he believed it to be the most efficacious and the most economical means practicable, and, in conclusion, moved that the ordinance on the subject of imported rags now in force in Boston, which requires them to be disinfected before admission to pratique, be adopted as the sense of the Convention and recommended for practice at all ports of entry of the United States. This was unanimously adopted.

Dr. D. W. Jeffries, of Chester, Pa., read a paper on the "Heating and Ventilation of Public School Buildings."

Dr. Albert L. Gihon, Medical Director United States Navy, read a paper on "Economic Sanitation," showing the importance of a more profound appreciation of the value of sanitary service in the body politic. He said it was futile to depend upon mere talking about physical reforms. Society must have more faith in medical men and measures. "Therapeutists, who are men of small ability generally, believe it is more dignified to administer to the sick man than to prevent him from becoming sick. The sanitary service demands the ablest men in the medical profession, and they should be handsomely paid. When this is done there will be no perfunctory cheap makeshifts as sanitary officers. Specialists pile up gold and greenbacks, while the man who sacrifices his life in preventing disease gets but a slight recompense. Well-paid permanent officials are absolutely necessary for sanitary purposes. If every scoffing councilman will dig from around the cobblestones in front of his door the fetid earth and slime and have it analyzed he will vote a larger appropriation for sanitary measures; and then, if he could see the swarms of living things in that dirt, he would probably vote a double amount."

"What provision has Philadelphia made to secure able officers to do the work of sanitary plumbing?" He denounced the parsimoniousness of prevailing sanitary measures. "The yellow-fever outbreak in this city in 1854 was the effect of loose sanitary methods, and its results cost more than a century's appropriation for a Board of Health. Pennsylvania, while behindhand in the organization of a State Board

of Health, is waking up, but to-day grave and reverend Senators at Washington are hesitating about appropriating less money than it would take for a Congressman's funeral expenses to pay a commission to visit Cuba and other countries to investigate the yellow-fever and its germs."

Dr. J. L. Sibbett, of Carlisle, Pa., read a paper on "Narcotic Appetites." He spoke of the dangerous abuse of the many medical agencies used as stimulants or sedatives.

Dr. Lawrence Wolff read a paper on "Drugs and Medicines," the purport of which was that their chief injury to the public health is due to their unrestricted use in quackish preparations; that druggists, as a rule, are free from blame, and that their handling should be entirely restricted to physicians and druggists.

Hon. Erastus Brooks, of the State Board of Health of New York, delivered an address at the evening session on "The Obligation of States and Cities to Preserve the Health of the People," which was full of practical suggestion and well worthy the attention of Government authorities.

On the second day the first paper was by Dr. Frank Woodbury, of Philadelphia, on "Physic-Tippling and Medicine-Bibbing," dwelling in particular on the consumption of opiates, bromides, and chloral, and numerous proprietary and quack medicines, all of which, he thought, ought to be restricted by law.

Dr. Henry Hartshorn, of Philadelphia, read a paper on "Continuous Preventive Disinfection of House Drainage" by the use of chloride of zinc and such other disinfectants in house drains as would, he thought, prevent the putrefaction of such filth as could not be wholly removed.

Rev. Dr. J. A. Harris, of Chestnut Hill, Pa., read a paper on "The Majesty of Law in Sanitation." He maintained that every death or illness from a preventable disease was the result of the violation of Divine law. He cited statistics to prove that the School Boards of Philadelphia persisted in violating laws, Divine and human, at the sacrifice of the health and lives of school children.

Dr. Charles Smart, Major and Surgeon United States Army, Member of National Board of Health, read a paper on "Water Supplies of Towns and Cities." He traced Philadelphia's eminence in typhoid deaths to the Schuylkill. He showed

that London, Brooklyn, and New York, whose water supplies are guarded from sewage, have an annual typhoid mortality of only 17, 23, and 21 to the 100,000, while Philadelphia has 64. To prove that the heavy rate was due to the admittedly contaminated water, Dr. Smart presented figures from Baltimore and New Orleans, which, without sewers, but with good water supplies, showed respectively 52 and 24 typhoid deaths per 100,000 on an annual average for the last ten years, against Philadelphia's 66. The Brooklyn death-rate would have saved 4400. Philadelphia lives in the last decade. He divided the contamination of water into animal-producing forms of the typhoid class, and vegetable-producing malarial fevers. Springs with carefully guarded area of source he considered the best possible supply.

Pemberton Dudley, M.D., of Philadelphia, Member of the State Board of Health of Pennsylvania, read a paper on the "Sanitary Significance of Sporadic Typhoid-Fever." He said that the gravest misconception of typhoid-fever by the general public consists in a mistaken idea as to the specific nature of the agency that produces it. Indeed, some people seem to have an idea that it comes without any assignable cause. It ought not, however, to be difficult to convince people of ordinary intelligence that a disease whose essential features are of so constant and unvarying a nature cannot be supposed to originate without a cause or from inconstant causes. He thought that the greater number of cases occurring in large cities was due to infection. Typhoid-fever is essentially a filth disease, and filth, he thought, was in most cases the primal cause; that the examples of typhoid-fever breaking out in houses far removed from the great cities, and, in fact, from other houses, left no doubt that direct contagion was not always to be blamed. He denounced privy wells, which abound in Philadelphia, saying that they defiled the air we breathe, the water we drink, and the food we eat, and that it seemed to him singular that the people of Philadelphia could put up with so much festering rottenness at their very hearthstone. He showed how the plague came to visit Plymouth. He traced the fever from that town to its very source, a house in the city of Philadelphia, with a filthy privy vault unconnected with a sewer.

The other papers read in the afternoon of the second and during the third day, for which we cannot now afford the space for abstract, were :

" The Relations which the Topography of Harrisburg, Pa., bear to its Drainage and Sewerage," by Dr. Hugh Hamilton, of Harrisburg, Pa. ; " Means of Elevating the Standard of Supplies," by Mr. H. W. Amerling, Philadelphia ; " Heredity and Other Peculiarities Affecting Health and Longevity," by C. W. Chancellor, M.D., of Baltimore, Md., Secretary State Board of Health of Maryland ; " The Duties of Sanitary Authorities in Reference to the General Use of Alcohol," by Professor Henry Leffman, M.D., of Philadelphia ; " Hygiene of Old Age," by Professor H. C. Wood, M.D., of Philadelphia ; " The Influence of Overwork in the Production of Nervous Diseases and Insanity," by Professor C. K. Mills, M.D., of Philadelphia ; " Defective Vision in School Children," by Professor P. D. Keyser, M.D., of Philadelphia ; " Vaccination," by Dr. William M. Welch, Physician in Charge Municipal Hospital, Philadelphia ; " Hygiene of Old Age," by Lawrence Turnbull, M.D. ; " Influence of Diet on Health," by A. K. Hills, M.D., of New York ; " The Financial Aspect of Sanitation," by Alfred Ludlow Carroll, M.D., West New Brighton, N. Y. ; " Social Sanitation Among the Japanese," by D. R. Simmons, M.D., of Yokohama, Japan ; " The Causation of Pneumonia," by Henry B. Baker, M.D., of Lansing, Mich., Secretary Michigan State Board of Health ; " Care of Animals in the Propagation of Vaccine," by Professor W. L. Zuill, M.D., Professor of Comparative Anatomy, Veterinary Department University of Pennsylvania ; " Drainage and Sewerage of Cities and Towns," by Colonel George E. Waring, Jr., of Newport, R. I. ; " Forced Ventilation and Ventilation by Heat," by Dr. Russell Thayer, of Philadelphia ; " Artificial Feeding of Infants," by John M. Keating, M.D., of Philadelphia ; " The Water Supply of Philadelphia," by J. Cheston Morris, M.D., of Philadelphia ; " Mistakes in School Architecture," by J. H. McClelland, M.D., of Pittsburg, Member State Board of Health of Pennsylvania ; " Disposal of Human Excreta by Fire," by W. S. Ross, M.D., of Madisonville, Ky.

The Convention was remarkable for the number and general

excellence of the papers. While the sessions were not as largely attended as they should have been, the attendance would compare favorably with other State Sanitary Conventions, and, considering the publicity given to the proceedings through the press, the result to the public cannot be otherwise than beneficial.

To the State Board of Health, and particularly to Dr. Joseph F. Edwards, Chairman of the Committee of Arrangements, and those physicians of Philadelphia who rendered the Convention so successful in eliciting public attention to the importance of public sanitation, the citizens of the State are placed under an obligation which we feel confident will express its appreciation in such health-protecting efforts as they have never heretofore exercised. That this will be the case was happily emphasized at the elegant banquet given by the State Board, on Thursday evening, as well, also, by the tangible evidence of the appetizing results of only a few days' devotion to the mere consideration of practical sanitation.

PROFESSOR WILLIAM H. PANCOAST.—The complimentary dinner tendered to Professor William H. Pancoast, on his retirement from the Faculty of the Jefferson Medical College, Philadelphia, by the Alumni of that institution, on Thursday evening, June 17th, 1886, was marked by a singularly happy assemblage of one hundred and twenty-three alumni, and nearly as many more of other members of the medical profession, many of them from distant places, and a sprinkling of distinguished laymen, besides which, from many who were not able to attend letters of regret and kindly greeting were read. Professor Addinell Hewson presided. Professor Pancoast read a carefully-prepared statement of the reasons for his retirement, which met the unanimous approval of all present. Many appropriate toasts were given and replied to with spirit, signifying the heartiest sympathy with Professor Pancoast in the necessity which had been forced upon him for severing the ties which had for so many years bound him to his *alma mater*, but which he could no longer maintain without sacrificing the dignity of his chair and the principles of his professional life to the caprice of mere rule makers without practical knowledge.

It will be gratifying to all who hope for progress in medical education to know that Professor Pancoast's retirement from the Jefferson does not mean retirement at the zenith of his fame from his functions as a teacher. He is far from being without honor, even "in his own country."

Quickly alive to the opportunity, the trustees of the Medico-Chirurgical College (of Philadelphia) lost no time in offering him a professorship in that institution of the same comprehensive scope as that upon which he had founded his reputation in the Jefferson, as Professor of Descriptive and Surgical Anatomy and Clinical Surgery. The Medico-Chirurgical College stands among the foremost of medical colleges in working out the problem of higher education, by establishing preliminary examinations and a three years' graded course. Medical students and post-graduates will, therefore, continue to have the benefit of his practical knowledge as *clinical teacher*, as well as instructor in surgical anatomy, and under such auspices as will not fail to add to both his reputation and honor as among the foremost of medical teachers.

THE PHILADELPHIA WATER SUPPLY.

COLONEL WILLIAM LUDLOW'S REPORT OF THE PHILADELPHIA WATER DEPARTMENT FOR 1884.

THIS voluminous and valuable report of the past operations and present condition of the Philadelphia Water Works, although for the year 1884, came but lately to hand, and would appear as possibly of but little interest as a report of current operations; but it is the last annual report of which we have any notice issued by the Philadelphia Water Department, and as it is the last report which we can expect from Colonel Ludlow, as, through the action of council, he is relieved from his position as Chief Engineer, and gives place to his late assistant, John L. Ogden, the report becomes of special general interest, aside from any local value it may have.

We shall give but small space to the items of purely local

interest, but quote freely from Colonel Ludlow's remarks as bearing on the matter of water supply in general.

The pumpage for the year averaged 69,658,969 gallons per day, or 72½ gallons per head of a population estimated at 960,000. The maximum pumpage for any one day was May 28th, of 95,686,444 gallons, and the least on February 10th, of 46,163,058 gallons. The average net cost of the pumpage per million gallons, raised 100 feet high, was $5.54 for the year 1884, a reduction in cost of nearly 17 per cent in two years. The Water Department, so far from being a burden, pays a heavy interest upon its total cost; for in the past thirty years, upon an expenditure of $19,000,000, it has collected $28,750,000, and turned into the City Treasury a net profit of nearly $9,750,000, the consumption of water the while increasing in a far greater ratio than does the population. The average increase in population in each decade from 1810 to 1880 is 37½ per cent, while that of water consumption is 94⅝ per cent—over 2½ times greater. In 1830 the supply per caput was only 17 gallons, while in 1860 it had more than doubled to 36 gallons, and in 1884 again doubled to 73 gallons. Attention is called to two facts in this connection. The first is, that this increase has taken place during the last twenty years at least, in the face of an almost chronic condition of short supply, as shown by yearly complaints and reports from the department. The second is, that under the conditions existing in Philadelphia, the per caput allowance as long ago as 1860 was really sufficient for all actual needs, and that the allowance in excess of about 40 gallons per day is, in fact, *waste*.

The extensive surveys of all possible sources of water supply, made under Mr. Rudolph Herring's immediate charge, commenced in 1883, have been continued in the same thorough manner, as previously noted, and are approaching completion. A few of the results may be anticipated to show about as follows: A pure and ample supply from the Delaware between Trenton and Easton, formerly estimated as costing from $20,000,000 to $30,000,000, it is shown would cost but about $7,000,000, and from the Perkiomen (an affluent of the Schuylkill) by a conduit but 28½ miles in length and of a diameter of 12 feet, 210,000,000 gallons daily may be had at a cost of

$6,500,000. Had Colonel Ludlow nothing further to show as the result of his labors than this comprehensive and exhaustive examination of all the possible sources for the future water supply of Philadelphia, he would have entitled himself to the lasting gratitude of his constituents, and left an enduring monument of his administration of the Water Department.

The sanitary survey of the valley of the Schuylkill conducted by Assistant Dana C. Barber extended from Pottsville to Philadelphia, embracing each town, village, manufacturing establishment, and tributary, giving in detail the sources of pollution in each ; and we wish that space did not forbid the insertion here of the impurities discharged daily into the river from one only of scores of similar establishments on the Schuylkill water-shed, for the benefit of New York City residents who at times enlarge upon the impurities of the Croton water.

If, as the average inhabitant of Philadelphia would maintain, and as scientific chemists resident there have certified before now, the water of the Fairmount pool in summer is to be recommended or tolerated for domestic use, then, according to the evidence afforded by Mr. Barber's investigations, it matters not what filth is cast into the river, nor in what quantities, providing there is a great variety and a plenty of it, in order to insure its entire potableness.

Just here we would digress a little. In 1875 a Commission of Engineers was appointed to examine and report upon the future of the Philadelphia water supply. It consisted of six individuals, four of whom were residents of Philadelphia. Dividing up their special duties, to a non-resident member of the commission was assigned that of reporting upon the sanitary aspect of the question ; this he performed to the best of his ability, oblivious of the fact that the word Schuylkill was in truth still regarded there as a synonym for purity and excellence. The conclusions to which he had arrived were apparently accepted by the commission, and the general report, which refers especially to the bearing of this particular paper upon the future of the water supply, was signed by the commission as a whole ; whereupon, with the understanding that the combined reports, as understood, would be put in shape for presentation to the Mayor, this gentleman took his leave ;

nor did he see the report of the chemical experts, nor that of the three resident members of the commission (Appendix F.), wherein the latter virtually indorsed the Schuylkill water as "good enough" (thus stultifying themselves completely), until they appeared in print. This private bit of history would not have been touched upon had not Colonel Ludlow very properly, in narrating previous efforts toward a solution of the local difficulty in selecting a proper source for the water supply of the city, called attention, in quoting the chemical analyses and the report of the commission of 1875, to the obvious discrepancy between the acknowledged facts and principles, and the announced conclusions in that report.

The sanitary aspects of the question, investigated and treated as they have been by Colonel Ludlow, aided by Dr. Leeds, admit of no ambiguity whatever, so far as they have gone, something yet remaining to be done on the Delaware. The ground thus far covered may be considered as exhaustively investigated, and it is to be hoped that it may be continued to completion in the same spirit.

We quote from his concluding remarks, as of general application to other localities, as follows:

"The creation and maintenance of a system of water supply to a great modern community is practically a never-ending problem. The needs of each generation so largely transcend not alone those of the preceding one, but even the estimates which could then have been formed of the future requirements, as to almost invariably exceed reasonable anticipations and far outrun the capacity of the existing constructions, even with considerable additions from time to time. Such, in brief, has been the history of almost all water supplies, and especially has it been the case in American cities where the general habit is to meet present emergencies and let the future take care of itself. . . .

"In some cases it is true that such partial provision creates difficulties when enlargements are required, and in the end the aggregate expenditures may exceed those which would have been necessary had bolder projects been inaugurated in the first place; but as large original estimates might have delayed the work indefinitely, it was probably often the wiser course to proceed with less ambitious plans. . . .

"The intimate relation of water supply to the public health, and other material as well as moral interests of the very first importance, need not be enlarged upon. It is second only, if second at all, to the protection of life and property, with both of which, in fact, its connection is of the closest. . . .

"In closing my report for the year 1884 I beg leave to make due acknowledgment to councils and to the Water Committee for the support and co-operation which, on the whole, have been extended, and to commend to favorable consideration the *personnel* and efficiency of the department as now organized.

"As rapidly as they were discovered the unfaithful and the inefficient have been weeded out, and as vacancies occurred it has been a constant endeavor to supply the places with a better class of employés, and so to raise the tone and improve the character of the service.

"I am glad to say that at the present time a continuous and marked improvement in these respects is manifest.

"The discipline is good, every man is held to accountability within the spheres of his duties, derelictions, whether by intention or neglect, are punished, and the employés in general display pride and interest in their work, and feel a sense of personal responsibility without which it is hopeless to expect good results.

"That these efforts to reach a higher plane have encountered obstacles and been attended with a greater or less development of friction and inertia cannot be denied. The organization covers an extensive field, and time is needed during the continuance of active work to infuse into it that spirit of fidelity and emulation which grows out of personal identification with the service. The considerable extent to which this now exists is mainly due to the feeling on the part of the employés, high and low, that their continuance depends solely upon the need for and the satisfactory character of their service, and to the rule of the department that its employés are servants of the city, and as such their activities and energies should be so directed and controlled as best to serve its interests without arousing unnecessary political or other antagonisms.

"It is unnecessary to say that these matters frequently

obtrude themselves, mainly, as I conceive, from the wide-spread impression among those who seek employment in the city departments that pertinacity of application and weight of indorsements should command success in competition with proven fitness and competency.

"Such, however, cannot be accepted as a basic principle in city business or in any other, nor could any organization so constituted be created and maintained in an efficient and economical condition, especially one so varied and technical and requiring such intimate co-operation of its several parts as the Water Department.

"I am persuaded that these views are in accord with those entertained by the great majority of our citizens and approved by their representatives in councils."

Here it would seem that Colonel Ludlow over-estimated the honest purpose of councils to legislate for the good of the public alone. He was slow to believe that the thorough efficiency of so important a department as the one committed to his charge would not commend itself even to the average councilman as a purpose to be served *primarily*, and that matters of personal or political consideration should, if permitted to prevail at all, be relegated to a lower place.

The lack of a hearty recognition of his indefatigable efforts and self-sacrificing labors by the city councils is a matter of extreme regret with all right-minded people. We would not presume to anticipate the effect of this upon his successor's administration, but it would be marvellous indeed if it did not prove disastrous, as judged from the standpoint from which we would now regard it. J. W. A.

UNENVIABLE DISTINCTION.—Minister's wife (looking over the paper): "You are referred to in this morning's paper, my dear, as 'a distinguished clergyman.'" Minister: "H'm. I thought that my sermon yesterday would attract attention. Is it published in full or only a synopsis given?" Wife: "Neither. You are spoken of as a 'distinguished clergyman' in connection with that patent medicine testimonial you sent Dr. Quack."

THE AMERICAN CLIMATOLOGICAL ASSOCIATION.

THE third annual meeting of this Association was held in the Hall of the College of Physicians, Philadelphia, Pa., May 10th–11th, 1886. The meeting was called to order at three o'clock P.M. by the President, WILLIAM PEPPER, M.D., LL.D., of Philadelphia, who proceeded to open the session by an address on "The Causes and Distribution of Consumption in Pennsylvania." The physical characteristics of the State were given, but the data obtained were not sufficient, he said, to justify any positive conclusions. They seemed to indicate thus far that consumption was most prevalent in the low-lying sections and on the watercourses where the rainfall was greatest, and the number of deaths from it gradually diminished as higher elevations with smaller rainfall were reached.

Philadelphia was considered separately. In a period of twenty-six years, out of a total of 100,000 deaths, 6000 were from consumption, the rate for each year being quite uniform. The rate among negroes had been more than twice as great. The rate among the foreign population had also been in excess of the general rate. Deducting these excessive rates among negroes and foreigners, the percentage of deaths from consumption, as compared with the total number of deaths from all causes, was 9.5, as against 14 when all classes are included.

The author wished this communication to be considered as preliminary only, as it is his purpose to continue the investigations he has undertaken, and to give the results more in detail hereafter.

Dr. A. L. LOOMIS, of New York, read a paper on "The Effect of High Altitudes on Cardiac Disease," in which he gave his experience in twenty-six cases, several of which he described. In all the cases coming under his observation the ventricular dilatation was unquestionably the cause of the sudden development of distressing symptoms, and the commencement

of the fatal issue seemed to be directly due to the effects on the cardiac circulation of a change from a lower to a higher altitude. The quality of the atmosphere, and probably the only operative one in bringing about the result, is the diminished density. Accepting this conclusion, the risk which one with even slight cardiac insufficiency runs by passing from a lower to a higher altitude is certainly very great, and if the insufficiency is extensive, such changes become immediately dangerous. And it must be remembered that cardiac insufficiency may exist in persons who give no evidence of it.

Dr. FRANK DONALDSON, of Baltimore, read a paper entitled "A Preliminary Account in Regard to Circulatory and Respiratory Changes Observed in Animals Placed in the Pneumatic Cabinet." The experiments had been performed by Professor H. N. Martin, of the Johns Hopkins University, and the reporter. The animals used were rabbits which had been chloralized. It was found:

(1) When the animal is breathing air from outside of the cabinet, rarefaction of air within the cabinet causes a marked fall of general arterial pressure, but has no influence on the pulse rate. The fall of pressure lasts only a short time (ten to twenty seconds), and is often followed by a temporary rise above the normal.

(2) This fall of systemic arterial pressure depends on two factors—greater flow of blood to the skin when the air around the animal is rarefied, and greater accumulation of blood in the lungs when they are distended.

(3) Of these two factors, accumulation of blood in the lungs is the more effective, for if the animal breathes air from the cabinet, and not from the outside, rarefaction of the air within the cabinet (in this case accompanied by no special expansion of the thorax) has but a trivial effect in lowering arterial pressure.

(4) When the animal is breathing external air, rarefaction of the air within the cabinet usually has no effect upon the respiratory rate, nor upon the extent of individual respiratory acts, unless the fall of blood-pressure be considerable. If it be considerable, symptoms of anæmia of the medulla oblongta show themselves. In some cases there is more forcible dyspnœic breathing, and in some dyspnœic convulsions similar to those

which occur when an animal is bled to death, and due to the same cause—namely, deficient blood flowing through the respiratory centre.

(5) The rapid recovery of general arterial pressure while the animal is still in a rarefied atmosphere, but still breathing external air, is probably due to excitation of the vaso-motor centre, which, as is well known, is excited whenever the blood supply is defective.

(6) The brain enclosed in a rigid box, which is practically unaffected by variations in the atmospheric pressure, has its circulation more disturbed in the pneumatic cabinet than any other organ, with the exception of the lungs.

(7) Compression of the air within the cabinet while the lungs are in communication with the external air causes a considerable transient rise of blood-pressure. This is probably mainly due to the forcing of the blood from the cutaneous vessels, but there has not yet been sufficient time to thoroughly investigate this point.

(8) Compression of air within the cabinet while the lungs are in communication with the external air slows the pulse as the arterial pressure rises. This is probably due to excitation of the cardio-inhibitory centre by increased intra-cranial blood-pressure. Further experiments are, however, necessary before this can be positively stated.

(9) In certain cases, when the air within the cabinet is rarefied and the animal is breathing external air, the respiratory movements cease altogether for several seconds. As to the cause of this physiological apnœa, we are not yet ready to form an opinion. It may be due to extra accumulation of air in the alveoli of the lung, or to distension of the lungs, exciting those fibres of the pneumogastric which tend to check inspiration.

Dr. H. F. WILLIAMS, of New York, assisted by Mr. Joseph Ketchum, inventor of the pneumatic cabinet, showed the working of the cabinet, and made "A Clinical Report of Forty-five Cases Treated by Pneumatic Differentiation." Sixteen cases were reported in detail. Following this, Dr. VINCENT Y. BOWDITCH, of Boston, read a paper on "Ten Months' Experience with Pneumatic Differentiation." He gave the clinical results of the treatment in twenty-seven cases

since June 30th, 1885. Pulmonary phthisis in its tubercular and non-tubercular forms; bronchitis in its acute and chronic forms, with and without emphysema or asthma, and retraction of the lung from long-standing pleuritic effusions, were the diseases which he had treated in the pneumatic cabinet. His experience was such that, although he had been unable to accomplish thus far such brilliant results as some others had claimed, yet he felt convinced of the very marked beneficial effect of the cabinet in many cases where other means had failed to give relief, and of its curative power in one case of incipient tubercular trouble, and he looked forward with hope to what may be done in the future with this new method of treatment. The speaker said his chief desire was that the profession should investigate the matter thoroughly and with fairness, and publish their results, for by this means only can a just estimate of the merits of the treatment be established. He felt that it should be intrusted only to a physician's care or to that of a reliable assistant, and that if placed in hospitals the most accurate methods of recording cases should be insisted upon before allowing the cabinets to be used. Carelessness of investigation in the present stage of its existence might do infinite harm to a method which may prove, when properly used, of infinite service.

The following table was given, showing the percentage of cases in which benefit had been accomplished:

19+% of all the cases treated received no benefit.

23+% of all the cases treated received very slight, moderate, or temporary benefit.

46+% of all the cases treated received marked benefit (for varying periods).

7+% of all the cases treated received remarkable benefit.

3+%

One case of incipient tuberculosis was cured.

Dr. I. H. PLATT, of Brooklyn, read a paper on "The Physics and Physiological Action of Differentiation." He considered two of the claims put forward by Dr. Williams and Mr. Ketchum, I believe, to be unfounded. The first is that the effect of removing a slight degree of pressure from the periphery of the body is radically different from that of increasing the pressure of the air entering the lungs, the former

acting as a *vis a fronte*, the latter as a *vis a tergo*. One of the most elementary principles of physics teaches that suction is not a force operating from in front, but is merely the removing the pressure from one side of a body and allowing the undiminished pressure to act upon the other side. It makes no difference whether pressure is taken from the outside of the thorax or added to the inside; in either case it is the unbalanced pressure which causes the increased expansion. The other proposition which I combat is that the spray or vapor used in conjunction with the differential process can be carried farther into the air-passages or more thoroughly condensed upon them than a spray or vapor could be under normal conditions. It cannot be carried so far, for the reason that the residual air is increased, and consequently the inspired air which carries the vapor or spray cannot penetrate so far. It is claimed that the vapor of medicinal substances is condensed in the lungs during the differential process by the compression consequent upon the commencement of the expiratory act. This is impossible, first, because compression only acts to condense a saturated vapor, and the air-passages cannot be saturated with the vapor of a medicinal substance, and, secondly, because no greater compression is produced at the commencement of the expiration under the influence of differential pressure than under other circumstances. Such compression as does occur is due to the resistance offered by friction of the bronchial tubes and by the narrow opening of the glottis, and it is impossible that these should be affected by the differential pressure. Such benefit as results from the use of the cabinet is due mainly to the reduction of congestion in the lungs by the air pressure within them and by the increased expansion and movement of the lungs favoring their greater action and modifying their nutrition.

The second day Dr. FRANK DONALDSON, in the absence of the President, occupied the Chair.

The report of the Committee on Health Resorts was received and ordered published in the Transactions. Dr. ROLAND G. CURTIN read a paper on "Rocky-Mountain Fever." He first referred to a communication received from Dr. D. G. Dougan, of Denver, Col., bearing upon this subject. The experience of Dr. Dougan had led him to regard all cases of mountain-fever as belonging to one or another of

the well-known already classified varieties. The cases, however, present variations from the usual course of the fevers to which we should assign them. Some of the cases are ephemeral in character and difficult of classification. The fever especially designated by the name mountain-fever presents many features of typhoid-fever. Some of the reasons for believing these cases to be an irregular or mild type of typhoid-fever are as follows: Such cases are usually seen at the season of the year when typhoid-fever is most prevalent. They occur most commonly under conditions favorable to the development of typhoid-fever; not infrequently cases will present some characteristic feature of typhoid, leaving no doubt as to the diagnosis. In the high altitudes where mountain-fever is said to occur a large proportion of the cases of undoubted typhoid pursue a remarkably mild course. Dr. Dougan concluded with a protest against admitting mountain-fever as a specific disease until its right to such a position had been proven by clinical and pathological researches.

In 1868 Dr. Curtin had seen in Wyoming Territory four cases which had been diagnosticated as mountain-fever. At some point in the disease all these cases had diarrhœa, and in one it was continuous. One of the patients died suddenly at the end of three weeks, but no autopsy was made. In one case there was a doubtful eruption. One of the cases had epistaxis in the beginning of the illness. Tympanitis was more or less marked in all. He considered these cases to be typhoid or typho-malarial in character. Sometimes the cases belonged, in all probability, to the class termed simple continued fever. The diagnosis of mountain-fever was doubtless in large part the result of incompetency on the part of the observers, and the use of the term is continued largely as a result of fashion.

Dr. C. C. RICE, of New York, read a paper on "How the Therapeutical Value of our Mineral Waters may be Increased." He advanced the following conclusions:

1. Physicians should make a careful analysis of our mineral springs.

2. The medicinal values of the waters should be tested by clinical investigation, and the conclusions published for the benefit of the profession.

3. If the waters are found to present marked merit, the

physician should interest himself in developing the springs, improving the bath-houses, etc.

4. Physicians in sending patients to the springs should be more careful to select the proper water, and should send with the patient the diagnosis and history of the condition, for the benefit of the physician at the baths.

5. The patient, while at the bath, should be under a more rigid medical discipline.

6. The social life of our watering-places should be reorganized.

Dr. I. H. MUSSER, of Philadelphia, read a paper on "Suggestions Regarding the Prevention of Phthisis in Mill-Hands." He stated that it was rather to prevent that state of the system which often leads to phthisis that he desired to make some suggestions. The suggestions more particularly referred to factory laborers. He showed that states of ill-health were common in this class of artisans, and asserted that it was very largely due to an inadequate supply of food, which was improperly selected and prepared, and to carelessness in attention to digestion. This cause obtained more largely than bad hygienic surroundings, or than the occupation itself.

If this be true the remedy proposed was to have the plan of the Willimantic Cotton Company used by all mill proprietors. That company has proved by experience and careful calculation that it pays them in quality and quantity of work done to supply milk to their boys and bouillon to their women twice daily, and that the health of the operatives is promoted and their lives prolonged thereby. Dr. Musser trusted that the members of the society could influence proprietors to adopt this plan, and therefore close one of the avenues to disease and death.

Dr. C. L. DANA, of New York, read a paper on "A Statistical Inquiry Regarding the Relation of High Altitudes to Nervous Diseases." He presented the results of inquiries made, at his request, of twelve physicians living in Colorado Springs, regarding the effects of high climates on the nervous system in health and disease. The majority thought that chorea in children was more frequent there than in lower altitudes, that the climate was bad for nervous women. The high altitudes do not necessarily injure epileptics, and in

anæmic cases might cause improvement. Insomnia, dependent upon anæmia and mal-nutrition, was benefited and generally cured. The climate had no specific influence for good upon diseases of the spinal cord, and, if anything, the contrary. The speaker was of the opinion that high altitudes had a tendency to excite lithæmia and arthritism with consequent irritating effects upon the nerve centres. The best effects of the climate were seen in anæmic insomnia, neurasthænia, and melancholia.

Dr. H. B. BAKER, of Lansing, Mich., read a paper on the "Causation of Pneumonia." Dr. Baker employed the data collected in the office of the Michigan State Board of Health relative to the disease, and the coincident meteorological conditions in Michigan, more especially during the eight years 1877–'84. He finds that certain meteorological conditions are so uniformly associated with sickness from pneumonia as to make it appear that they bear a causal relation to that disease. The atmospheric condition which is most closely associated with pneumonia is the night ozone; but, although it is, perhaps, one factor, the manner in which it is associated does not indicate that it is always the controlling factor in the causation of pneumonia. Besides, the amount of ozone is, to a great extent, controlled by the temperature; therefore, ozone is not a primary cause. The velocity of the wind has rather close relations to the disease. Variations in atmospheric pressure appear to have influence in the causation of pneumonia. Relative humidity of the atmosphere has apparent relations to the disease in some months, but it all depends largely upon the atmospheric temperature. Absolute humidity of the air has very close relation to pneumonia, and in such manner as to indicate a causal relation. That condition of the air, however, is, so far as relates to outdoor air, almost wholly controlled by the temperature. Finally, the curves representing the average temperature uniformly bear a very close relation to sickness from pneumonia; and the curves representing sickness follow uniformly at such a period after the temperature curves as to make it seem certain that the sickness is, directly or indirectly, caused by a comparatively low temperature.

The paper consisted in great part of tables, and was illus-

trated by thirty-one diagrams. These diagrams were drawn accurately to scale, and represented immense numbers of cases and deaths from pneumonia, and meteorological observations at the same times and places. The magnitude, and hence the probability of their accurately representing average conditions, may be inferred from the fact that the curve for temperature in Michigan was based on 154,500 observations; that the curve for sickness from pneumonia in Michigan, which followed so closely the curve for temperature, was based on 31,014 weekly reports of physicians; 5473 deaths from pneumonia in Michigan are tabulated and graphically shown; as also 114,119 deaths in London, England; also 11,596 deaths and 49,487 cases of pneumonia in the United States armies during the three years 1862–'64; about 10,000 cases of "respiratory disease" (not including phthisis) in the European and native troops in India, were also shown in diagrams, with a curve of the temperature at representative stations. The statistics of the other States and countries serve to re-enforce those of Michigan; and Dr. Baker says he has found no statistics which conflict with conclusions drawn from the Michigan statistics, although he considers the statistics of sickness in Michigan the most reliable of all.

Dr. G. R. BUTLER, of Brooklyn, N. Y., read a paper on "Mitral Stenosis," giving the histories of fourteen cases.

The following papers describing the climates of various places were read: "The Climate of Mexico," by Dr. Didama, of Syracuse; "The Southern Adirondacks," by Edward T. Bruen, M.D., of Philadelphia; "The Climate of El Paso, Tex.," by Dr. E. W. Schauffler, of Kansas City; "Southern Pines Park," a new health resort in North Carolina, by Dr. A. N. Bell, of New York. Some of these we purpose giving in full—or, at least, liberal abstracts of—hereafter.

After electing new members, appointing several committees, and passing a vote of thanks to the College of Physicians for the use of their hall, the Society adjourned.

The officers elected for the ensuing year were:

President: Dr. Frank Donaldson, Baltimore.

First Vice-President: Dr. V. Y. Bowditch, Boston.

Second Vice-President: Dr. Roland G. Curtin, Philadelphia.

The next place of meeting, Baltimore.

THE CLIMATE OF COLORADO.

THE Rocky Mountains on their eastern side rise precipitously from the great desert plains which extend from their base to the Missouri and Mississippi rivers. Although these plains are apparently level, there is a gradual rise to the westward, until, at the base of the mountain range, they reach an elevation of between five thousand and six thousand feet. On this plateau, Denver, Colorado Springs, Manitou, and other cities and towns of Colorado are situated, which of late years have become noted as resorts for invalids suffering from consumption and other lung diseases; and there are many persons now living there in vigorous health who came with diseased lungs, hardly expecting to survive more than a few weeks or months.

Like all similar localities, the perfection of the climate and its curative power have been more or less exaggerated; but, allowing for this, there are certainly many things about the climate of Colorado which render it especially adapted to this class of invalids. Its distinguishing characteristics are the dryness and purity of the air. Except in the rainy season, from July to October, fair days are the rule; and although the extremes of temperature are as great as in the East, owing to the dryness and rarity of the air, they cause no inconvenience. We have observed a temperature of ninety degrees in the shade, at Denver, when it was perfectly comfortable to walk in the sun, and ladies on the street did not even make use of parasols; while one of the stories that the natives regale new-comers with is to the effect that small boys go skating in winter in their shirt-sleeves. There is no day in winter when open-air exercise is impracticable; and the exhilarating effect of the pure mountain air renders one inclined to take exercise, a very important matter with invalids. In the summer, hot weather is common, but it has no debilitating effect; and the nights are invariably cool and refreshing.

Before recommending a change of climate, the physician should take into careful consideration the constitutional peculiarities of his patient. There are many to whom a warm,

equable temperature and moist atmosphere is most grateful; they are worn out with suffering, and need rest and quiet: to such the climate of Florida or Southern California is best adapted. But there is a large class of consumptives who need a bracing and stimulating climate—one which will send the blood through their veins more briskly, and by strengthening the diseased organs, and improving the bodily health, assist nature to effect a cure. The purity of the air at this high altitude, and its freedom from microbes and disease germs, are also important factors in the case.

The unfavorable points about the climate must not be overlooked. Owing to the rarity of the air, more work is thrown upon the heart, and, if there is any tendency to disease in this organ, it is rapidly developed. After a residence of a few years, many persons complain of great nervousness, owing to the stimulating effect of the climate, and are obliged to return to a less elevated region. High winds are very common; and at such times the air is filled with fine dust, very irritating to the lungs. And, last but not least, the cost of living is rather high, though perhaps not more so than in Florida. Nearly every one, on his first arrival, experiences some slight unpleasant symptoms. The lips become dry and parched, the voice becomes hoarse, and there is usually more or less bleeding from the nose. But these soon pass away, the appetite increases, and the cool nights and soothing properties of the air enable the most wakeful sufferer to obtain a refreshing sleep.

Formerly the accommodations for invalids, or even persons in good health, were of a very primitive and uncomfortable kind; but, with the wonderful growth of the country, first-class hotels have been erected in all the principal places. Denver, Manitou, Gunnison, and Colorado Springs, all have the very best accommodation for either invalid or tourist; and the last-named place is an almost ideal winter resort. It is a modern town, built on a gentle slope facing Pike's Peak and the Rocky Mountain Range. Good roads lead in all directions over the plains and among the mountains, through some of the most magnificent scenery in the world. The society is largely composed of refined and cultured Eastern people who have come there for the benefit of their health. Colorado College is located here; and the town possesses good schools,

a beautiful little theatre, and one of the finest and most comfortable hotels in the country. According to the plans of the original founders, every deed transferring real estate contains a stipulation that no liquor shall be sold on the premises. The traffic is confined to the drug-stores; and although it must be confessed that these latter are suspiciously numerous, yet the entire absence of low saloons and groggeries is a very pleasant feature of the town. Well-built and equipped railroads furnish frequent communication with all parts of the country. The "Springs" are at Manitou, a charming little mountain town under the shadow of Pike's Peak, and eight miles distant by rail or carriage-road. The water contains carbonates of lime, magnesia, and iron, besides a large amount of free carbonic-acid gas. It is pure, and very agreeable to the taste, but probably possesses no especial medicinal properties.

While, as we have remarked above, a special consideration of every case must be taken before recommending a change of climate to an invalid, yet the climatic conditions of Colorado seem especially favorable to the cure of lung diseases; and, even if the patient is past all hope, "it is a splendid country to die in," as an enthusiastic native remarked. It is true, that even if a cure is not effected, the course of the disease is attended with less suffering than usual; and if one's circumstances are such that he can be among friends, and provide himself with the comforts and luxuries which an invalid requires, we think a residence in the mountain regions of Colorado will be attended with beneficial results. If, however, the patient's means are limited, and he must economize in his expenditures to the extent of denying himself proper food and comfortable accommodations, his home is certainly the best place; for neither in Colorado nor in any other place will the climate be a compensation for the loss of the accustomed comforts and conveniences of a good home.—*Popular Science News.*

DR. B. F. NICHOLLS, Physician to the Howard Hospital, Philadelphia, Pa., in a recent article on Nervous Diseases, in the *Medical Brief*, states that, from his experience with celerina, he believes it to be a remedy that will meet the indications of all cases where nervous prostration plays an important part.

THE SANITARY CONVENTION AT KALAMAZOO, MICH., JUNE 1–2, 1886.

THE convention was held under the auspices of the Michigan State Board of Health, which was represented by Professor Victor C. Vaughan, of Ann Arbor; Dr. John H. Kellogg, of Battle Creek; and Dr. Henry B. Baker, of Lansing.

After the address of welcome by the Mayor of the city, Hon. Peyton Ranney, and the address by the President of the Convention, Hon. H. F. Severens, Dr. H. H. Schaberg, health officer of Kalamazoo township, read a paper on "Diseases of Poverty." The diseases incident to poverty include among their causes malnutrition, insufficient or improper clothing, and the bad hygiene of poorly-built, unhealthy dwellings. The terrible results of deficient or improper nutrition are found in the infants of the poor. It virtually kills the child in many cases. How can an infant's weak organs assimilate the improper food thrust on it? The mother, weakened and harassed by lack of food, and prematurely broken down by overwork, is unable to give a child a good constitution. And when the natural food of the infant is supplemented by unfit food from other sources, its life is stopped by terrible suffering. Indigestible food causes many untimely deaths, killing more human beings than all other causes. Insufficient or improper clothing is also a great evil, too warm in summer, too cool in winter, causing the child to become stunted or dwarfed. Ignorance kills rich and poor. Poverty often debases by stunting the sensibilities, destroying the sense of cleanliness by close quarters and lack of means for cleanliness. Despair, discouragement, and surrender to these circumstances follow. Filth does not start a contagion, but it causes it to become more virulent and prolific. The physician in such cases has to battle against ignorance, obstinacy, and resentment, where the case needs the most favoring circumstances. It has to be treated and checked where the family live, in one or two rooms, with no ventilation, over a poisoned cellar or soil that is a death-trap. The doctor cited a case in his practice, of ob-

stinate disease that was finally overcome by simply moving the patient to wholesome air. He noted particularly one local cause of ill-health, in the practice of girls working in the celery gardens in the late fall doing themselves great mischief by keeping their hands in the cold water washing celery for market, sowing the seeds for much future evil.

"Sanitary Regulations of the Hebrews" was the subject of a paper by Rabbi Ignatz Mueller, of Kalamazoo. He showed the growth of interest in sanitary regulations to the present day, and emphasized the misery produced by ignorance. Hatred against the Jews had kept the knowledge of their sanitation from the world. Two principles stand out prominently in the Jewish regulations. The Hebrews insisted on cleanliness and temperance. Cleanliness was the first condition of health, and the discrimination between clean and unclean food was shown by the rabbi by frequent scriptural quotations. The regulations concerning food were supplemented by those concerning conjugal life and purity. Violation of marriage vows was punished with death. Sanitary activity extended over both public and private interests. The dead were decently buried, though they were friendless. The principle of temperance was no less carefully observed. The Mosaic code did not favor asceticism or austere abstemiousness. The use of wine was allowed. It is an error that the Jews do not and did not use fermented wine on the feast of the Passover. Wine is not wine unless fermented. Hebrew and Greek passages were cited in proof of this. Indeed, there would be no merit in the moderate use of that which cannot intoxicate. A Talmudic fable illustrated Satan's use of wine and the abuse frequently made of wine. Intemperance was strictly forbidden by the Jewish code, and most impressive words are used against it as the source of crime and degeneration. The intemperate and gluttons were punished by being stoned to death publicly (Deut. 21 : 18–21). And this very thing had such a great influence upon the Jews that not only, as the Talmud says, was this law never enforced, but is it not true, even nowadays, that one rarely finds any drunkards among Jews? Now you see a striking resemblance between our modern sanitary provisions and those prescribed by the Mosaic code. But we see, at the same time, while our modern sanitary regulations

do not much interfere with the habits and manners of the individual life, the Mosaic law draws even these into the sphere of its codification, and regulates them without encroachment in the realm of individual freedom.

Mr. Frank Wells, of Lansing, Mich., read a paper on "History of Investigations Concerning Micro-Organisms, and the Germ Theory of Disease." Everything is filled with these minute beings. These spirits of the air are ever-contending for an existence, the life germs and the death germs. The old theory that decay is a process of oxidation has given way to the new one that this process is caused by living organisms, which cause apples to decay, eggs to become addled, and yeast and other things to ferment. The paper described the long contest between the disciples of Darwin and their opponents, whether there was such a thing as spontaneous generation of life, or the apparent evidences of this were merely produced by organisms contained in the air and other mediums. The history of science, the speaker remarked, was a history of the overthrow of beliefs, and such was the fate of the theory of spontaneous generation. The struggle between these two theories passed through an eventful course. One young chemist, Louis Pasteur, doubted the efficacy of the tests that had been relied on to prove spontaneous generation, and produced experiments that for a time settled the matter. A rival inclosed a wisp of hay in a receptacle filled with artificial air, the air having been submerged in mercury, which was assumed to cut off all trace of living organisms, and succeeded in showing the development of life in the hay after those close precautions. Pasteur, however, reversed the conclusions of the demonstration by showing that mercury itself was a medium for carrying the organisms, and must have supplied such to the hay. He then procured air from different localities where the atmosphere was little laden with germs. Those which were freest were from up on the Jura, and were taken from the stratum of a strong wind in the high atmosphere. With these specimens of air that were shown to be in most cases wholly free from organisms, he showed that the union of air with putrescible liquids did not produce animalculæ. Tyndall's tests, showing that the clearing of the air, by passing it through flame, demonstrated the materials in it to be organic

matter, and his final and conclusive tests with test tubes in an isolated chamber, putting an end to all further dispute, were also described.

The similarity of certain contagions to fermentation early led to a suspicion of the germ theory of disease. The paper described one of the earlier demonstrations in a particular class, the near annihilation of the silk-worm industry in France, and loss of $20,000,000 a year; the appeal to Pasteur to investigate, and his almost instant discovery that the disease was caused by a minute organism, and the complete remedy he suggested in having the silk-worms raised from eggs free from the infection. His experiments in identifying the cause of splenic fever in sheep and cattle, and chicken-cholera in fowls, and demonstration of a remedy in vaccination were also described. His experiments showed that the virus could be used to protect against itself, going so far as to silence all doubters. Lyster showed that bad results of surgical operations were due in great part to microbes. Dr. Koch made the discovery that consumption was due to bacilli, which seized on people predisposed to it. The saliva and fluids of the alimentary canal furnish a medium for the disease germs. The cholera bacillus was soon afterward discovered. The possibility of vaccination as a preventive was foreshadowed. Those organisms were found to be enormously productive, multiplying to the extent of 16,000,000 for one in twenty-four hours. The paper also described the more recent experiments of Pasteur on rabies; the inoculation of a rabbit by trepanning its brain and infecting it with the virus; then transmitting it from one rabbit to another through a long series till the virus was attenuated, and could safely be used for inoculation.

Professor Victor C. Vaughan, M.D., Ph.D., member of the State Board of Health, delivered an address on "Disinfection." It is the office of disinfection to destroy the germs described by Mr. Wells's paper. The difference between disinfection and antiseptic properties must be kept in mind, the agency of the latter being to retard decay. A common instance is the use of salt; another that of smoking meats to preserve them, the creosote of the smoke being the active agent. A disinfectant is a germicide, and many of these germs can be killed if we can find out where they live. Germs

multiply by a process of dividing themselves or through spores, analogous to seeds. Disinfectants are of two classes, as they destroy the germs themselves or their seeds. Fire is one of the best disinfectants. Steam is next to fire. When heated to the degree required for twenty-five pounds' pressure it is very valuable, and can be applied to articles through the medium of a tight box. It is impossible to disinfect a room while occupied by human beings. Among the common disinfectants a good one is corrosive sublimate, using two ounces of the solution to a gallon of water. Chloride of lime, eight ounces of the solution to a gallon of water, is good, but does not want to be placed in a saucer; put a quart of it in the commode that receives the excreta. The burning of sulphur to purify a room, as after diphtheria, is effective. The room should be made tight. Use three pounds of sulphur to every 1000 cubic feet of room space. The room can be opened and aired after twelve hours. Professor Vaughan also dwelt on the means taken by physicians and nurses to prevent taking a contagion or carrying it in their clothing.

"The Sanitary Aspects of the Proposed Straightening of the Kalamazoo River," by George S. Pierson, City Engineer of Kalamazoo, was purely of local interest.

"Healthy Homes," by Professor Victor C. Vaughan, of Ann Arbor, was devoted mainly to the homes of the working-classes, but the principles stated were of interest to all classes. A cottage may be as healthy as a palace, but it must stand on soil in which there is no animal, and not much vegetable matter. A house on damp ground breeds consumption. A layer of cement, impermeable by gases, should be placed beneath the floor. The cellar should have windows hung on hinges, kept open when practicable. Use no arsenical wall paper. A good druggist can make the arsenic test at small expense. Make the floors of hard wood, and have tight joints. Rugs are preferable to carpets. Do not shut out the sun; faded carpets are not so bad as faded cheeks. Have the living-rooms on the sunny side of the house. The kitchen is the most important room in the house; if it is filthy and unhealthy, all else is vain. It should have windows on two sides, and an independent ventilating-shaft. Have both window-sashes movable in all the rooms. Houses built without ventilation

can be partially ventilated by a short board, setting under the lower sash, leaving a space where the sashes join. A room heated by a stove can have a good air supply brought into the room by a pipe, opening into a jacket around the stove. Ventilation can be had by a pipe leading from near the floor to the chimney, but a chimney should have one flue for smoke and another for foul air. Water is a great source of disease. When a cistern is filled from the roof it should be arranged so that the first washings of the roof in a storm can be turned off from the cistern. Build the cistern so that the soakage from the surrounding surface is impossible. With regard to the disposition of excreta, the professor preferred the dry-earth system, the accumulations being removed semi-monthly. It costs less than $5 a year, and does not admit of contamination. Garbage should be burned. Cesspools should be water-tight, ventilated, and emptied once a month.

A paper on "Sanitary Condition of Public Buildings in Kalamazoo" was read by Dr. John H. Kellogg, of Battle Creek, member of State Board of Health. He had made a personal examination of the churches, jail, and school buildings of Kalamazoo in regard to their heating and ventilation. The paper was of general as well as of great local interest. Besides a description of the needs of the several buildings examined, he gave a good outline of the principles of heating and ventilation.

Dr. C. B. Cornell, on the "Need of a Public Hospital in Kalamazoo." There were three papers on "Personal Duty of the Citizen Touching the Prevention and Spreading of Communicable Diseases"—from the standpoint of the lawyer, by Judge A. J. Mills; from the standpoint of the clergyman, by Rev. F. Z. Rossiter, of Kalamazoo; and from the standpoint of the health officer, by Dr. Foster Pratt, of Kalamazoo. Judge Mills specified the several classes of laws relating to public health, which it is the duty of the citizen to uphold, by co-operating with the health authorities. Rev. F. Z. Rossiter dwelt upon the peculiar trials of each of the dangerous communicable diseases. He took a model city, which he called Fair View, and outlined objectionable conditions as well as desirable conditions in such a place.

Rev. R. E. Jones, of Kalamazoo, said if the public would not uphold the officers, the law could not be enforced. It is

the duty of the citizens to uphold the officers, and of the officers to enforce the laws which they have sworn to enforce.

Dr. Foster Pratt, of Kalamazoo, asked attention to the fact that scarlet-fever and diphtheria are dangerous and fatal diseases, causing deaths compared with which the deaths from small-pox are insignificant; yet that people do not fear them shows that they do not understand the facts. Citizens should inform themselves on these subjects, and then they should co-operate with the officers of local, State, and national boards of health for the exclusion, prevention, and restriction of communicable diseases.

The President of the Convention, Judge Severens, before the close of the session, said that the purpose of the convention had been noble. The statutes of the State in an early day on sanitary subjects were of no account, but of late a scheme had been developed which showed some good sound sense. These conventions are for the benefit of the people. The attendance had been light, but the publication of the papers would instruct and benefit many others. Great good, he thought, would be accomplished by the continuation of conventions of this kind.

DR. FERRAN.—On the 22d of April last a special meeting of the *Real Consejo de Sanidad* was held, in Madrid, to consider the application of Dr. Ferran to be permitted to *vaccinate* (inoculate?) against cholera.

After an animated discussion six of the twelve members present voted against granting the application, because the scientific facts did not give sufficient grounds to warrant the proceeding; the other six voted in favor of the petition. The vote of the president, Señor Alonso Rubio, was given in favor of the petition. During the discussion Señor Sanchez Molero offered a resolution which will be discussed at subsequent meetings of the council.—*Las Novedades*, New York, May 13th.

Vaccinate as applied here and elsewhere under similar circumstances is a most objectionable term. What has the calf —*vacca*—ever had to do with this process? As well say *vaccination* for *transfusion*.

ON SUCTION OF SEWER GASES INTO SERVICE-PIPES CONVEYING DRINKING WATER—A FERTILE CAUSATION OF ENTERIC-FEVER.

AT a meeting of the Medical Officers' Health Society, held on January 15th, Dr. Corfield, President, in the chair, Dr. Horace Swete read a paper which showed an insidious danger that existed where a vacuum was formed by water-pipes being suddenly turned off from the main, and the means he had devised to prevent such an occurrence. He first pointed out the danger attending the intermittent water-supply, and very often also the constant service supply, as various occasions arise for shutting off portions of the water-supply for making repairs, flushing, etc.; it is when this happens that a vacuum is formed and sewer gases admitted into the water-pipes. This was illustrated, first, in Dr. Blaxall's report to the Local Government Board of enteric-fever occurring at Sherborne; secondly, in that notable case of typhoid-fever at Caius College, Cambridge, where Dr. Buchanan in a most masterly way discovered the source of sewer gas in the one water-closet which was attached to the room of one of the Fellows, in which during his absence the dry weather caused the small syphon of the weeping-pipe to dry up, and gases freely came from the town sewers, and were sucked into the pipes supplying the students with water. Dr. Swete then referred to his own personal knowledge, how he found coal-gas at Droitwich in the drinking-water sucked in from an adjoining gas-main; and again at Kidderminster, the water-supply falling short, the main was turned off daily for several hours, the cause of the outbreak here being not in the well-water, but in that which passed through the pipes, which, being constantly milky when drawn, showed that air—viz., sewer gas—had found its way by suction into the vacuum formed by the water having been turned off. He then went on to point out the means of preventing this danger, and came to the conclusion that the only true protection would be to admit air into the highest point of

house service-pipes whenever the water was turned off, thus effectively to prevent suction either by syphon action or by the formation of a vacuum in the service-pipes. To effect this he constructed a dome-shaped valve, inside which a float surmounted by an elastic disc presses against a metallic diaphragm ; above the diaphragm are holes to admit air, so that when the water falls the float falls with it, and air is admitted ; when the water is again turned on, the float rises and seals the valve ; the greater the pressure the more closely the valve is sealed. The objections that have been raised against these valves are : 1. It is a sanitary fad, and there are plenty of others in the market. There are certainly some traps, and also an automatic valve, which entirely failed at Caius College, Cambridge. 2. Why not simply bore a hole in the top of the service-pipe and so admit air? Truly, such a hole will admit air, but what a splendid fountain would be made with a head, say, of two hundred and fifty feet of water! 3. What is the necessity of such valves when we have separate cisterns for the water-closets? These often fail, as was the case in the typhoid outbreak at Kidderminster. 4. The fear that, unless care is taken to place the valve where foul air cannot touch it, it would not be of much use. To this objection the author stated that it was not intended to place the valve under any water-closet, but to keep it at highest point outside any such place ; even were it placed inside, the air could only act on a very small film of water and without any pressure ; whereas in suction, air, conveying with it organic matter, passes through a considerable quantity of water in the pipes, and all organic impurity is washed from the air-bubbles into the air.—*The Lancet.*

A VACCINE TOOTHPICK.—According to a London paper, a Thorndale apothecary left some fresh vaccine points exposed to view on his counter. A burly farmer, unnoticed by the druggist, amused himself by using one of the points as a toothpick, pricking his gums in the operation. It "took;" and the farmer's mouth, though pretty full for utterance, doubtless does utter some things about the man who left those "infernal things" on the counter.

SYPHILIS:
THE PREVENTION OF ITS DISSEMINATION.

By JOHN ALSDORF, M.D.

IN seeking to establish some plan for the limitation or prevention of the dissemination of syphilis, it is important to appreciate what has been determined regarding the disease, before considering the plans that have, thus far, been proposed for the attainment of this object.

That syphilis is one of the most grave diseases to which humanity is exposed, no one will deny. Opinions as to its hereditary transmission have, however, been materially modified by the microscopic investigations of Beale, corroborated by Alfred von Biesiadecki, Cohn, M. Cornil, and Rindfleisch, demonstrating that a living germinal cell was the starting-point in this disease. The doctrine of a mysterious instantaneous syphilitic infection is, by them, denied, and a gradual infection, through physiological channels, alone considered possible. In order, therefore, to acquire syphilis an organism free from that disease is essential. The infecting cell must first be brought in contact with otherwise healthy cell material. No mysterious hereditary influence is necessary, nor can be admitted.

These views were originally published by Fessenden N. Otis, M.D., Professor of Genito-urinary Diseases, in the College of Physicians and Surgeons, New York, in a series of class-room lessons in 1879, and again in his volume on the Physiological Pathology of Syphilis, in 1881, and elaborated more fully in an article on the Syphilis of Infants and Hereditary Syphilis, in 1884. Mr. Jonathan Hutchinson, of London, a leading authority on syphilis in Great Britain, has arrived at conclusions identical with Professor Otis's, in regard to the nature of the so-called hereditary syphilis. In his "Pedigree of Disease," published in London, 1884, he says: "A child then, I assert, inherits syphilis in precisely the same

sense and in precisely the same manner as it may inherit small-pox. It inherits not *the diathesis, but the disease.* The reason why the inheritance of small-pox is rare, while that of syphilis unfortunately is common, is simply that the period during which the virus is extant in the blood is very different in the two cases. The conspicuous facts, then, in reference to the syphilis of infants afford no proof that the diathesis of syphilis, any more than those of the other exanthemata, is capable of transmission. My argument, if I have made it plain, has pointed to the conclusion that no *minified* transmission of syphilis is possible, and that the child gets either nothing at all or the germs of the disease, and that in the latter case they will, subject to the laws of idiosyncrasy, develop equally in all cases."

All authors are agreed that the communication of syphilis, after the third year of its existence, is rare. It has, also, been determined by careful clinical observation that the contagious element of syphilis is, as a rule, eliminated within a period varying from perhaps two to four years, and that all the manifestations of disease beyond this time, and apparently due to syphilis, called tertiary lesions, are not entitled to be considered, strictly speaking, as syphilitic. Mr. Hutchinson says of them : "What are called tertiary symptoms do not constitute a necessary stage of syphilis, and are to be regarded in the light of sequelæ." This statement is corroborated by the fact, now well determined, that the secretions of all such lesions are innocuous ; and that neither they, nor the tissues, nor the blood of patients bearing such lesion contain a contagious element. Without the *contagium* there can be no syphilis.

In the recent valuable paper on the Limitation of the Contagious Stage of Syphilis, especially in its relations to marriage, read by Professor Otis before the New York State Medical Society, February 5th, 1886, and published in the *Journal of Cutaneous and Venereal Diseases*, Vol. IV., March and April, 1886, the author, in a very able manner, has demonstrated :

First. That the true contagium of syphilis is a diseased germinal cell (with or without a specific micrococcus), capable of inoculating other cells by contact, and only causing destruction of tissue by proliferation of cell elements.

Second. That for a period of eight weeks this contagium is confined to the initial lesion and the lymph channels and glands in immediate relation thereto.

Third. That after the active or secondary stage of the disease has passed it cannot be communicated to a healthy person.

Fourth. That the physiological secretions, mucus, milk, tears, sweat, sebum, urine, semen, etc., do not contain the contagium of syphilis as proven and accepted by such authorities as Fournier and Cornil, of Paris; Mireur, of Marseilles; Van Buren and Keyes, and Bumstead and Taylor, of New York; Hill and Cooper, of London, and others; and further, if contact of a degraded germinal cell is essential to the production of syphilis, and the disease is conveyed to the embryo or fœtus only through the blood of the mother, there is no longer, strictly speaking, any hereditary transmission of syphilis.

Fifth. That tertiary symptoms are but sequelæ due to pathological changes occurring during the active or contagious stage; and,

Sixth. That the disease is self-limited, and may be fixed, with or without treatment, at a point within the period of five years.

"By the acceptance of the above views," says Professor Otis, "we have a clew which will lead us to a reasonable explanation of every stage and lesion of syphilis—an explanation in full harmony with all known physiological and pathological laws."

Having thus presented the modern views as to the disease, it only remains to say a few words regarding its contagiousness and sources of contamination before proceeding to the real purpose of this article—viz., the discussion of some plan for the prevention of the dissemination of syphilis. The following extract from a report of the committee from the American Public Health Association on a plan for the prevention of the spread of venereal diseases, proves conclusively that of all contagious diseases to which the human species is liable, and which cause the greatest evils to society, there are none more serious, more dangerous, or so much to be dreaded as syphilis:

"Even were it possible to obtain accurate information of

the number of cases of venereal disease contracted in cities, it would give no indication of the actual injury to the human race by these diseases. It would take no account of the myriads contaminated by mere contact with the infected, who mingle in every crowd. Every one instinctively shrinks from the touch of the sufferer with small-pox, but how few realize that the syphilitic is a leper also to be shunned? How few mothers are aware of the danger to themselves and their children from nurses and housemaids drawn from a population in which every fifteenth person is diseased? How few parents suspect the peril to their daughters from her accepted lover's kiss, who may be that one in every five young men among the better classes who has a venereal disease, which there is one chance in two is syphilis? These are not speculations.

"When the public knows by how many thousand channels this disease may assail them, your committee have no doubt that they will demand protection at any cost, and they urge upon this association the promulgation of the fact that so long as syphilitics are allowed to go unrestrained, the spotless woman and the innocent child share the danger of contamination with the libertine and prostitute.

"Let it be known that this fearful pest may be communicated—

"By the blankets of the sleeping-car, the sheets, towels and napkins of the steamship, hotel, or restaurant;

"By the hired bathing dresses of the seaside resort and the costumes rented for the fancy-ball;

"By the chipped edges of a coffee-cup, as seen at most hotels and eating-houses, and their half-cleansed knives, forks, and spoons;

"By the public drinking vessel in the railway car or station, as well as the public urinal or closet;

"By the barber's utensils, the brush and comb in the guest chamber, the hatter's measure, or the borrowed or sample hat;

"By the surgeon's or dentist's instruments, or the vaccinator's lancet;

"By the broom or dust-brush handled by a parlor-maid, or by the spoon touched by the mouth of the cook or nurse;

"By the toys sold to children in the streets by venders with poisoned lips or fingers;

"By playing-cards and visiting-cards which have been used, and especially by car-tickets and by the paper money which circulates in a city where fifty thousand syphilitics are at large;

"By the loaned pipe or cane or glove;

"By the grasp of a friend's hand or the kiss of an accepted lover; by the son to his mother and sister; the husband to his wife and unborn child, and by the latter to its mother.

"Were venereal disease restricted to those who seek illicit sexual gratification it might be well to let the guilty suffer and die; but when their sin is sure to leave upon them an ineradicable taint and to be transmitted to their helpless offspring; when, worse than all, the syphilitic leaves his stain upon whatever he touches to foul the chance passer—man, woman, or child—as fearfully as if they had visited the vilest lupanar, it becomes the duty—the most important of all its duties—of this association to devise some plan for their protection."

Given, then, a disease, differing in no respects from small-pox, scarlet-fever, diphtheria, measles, and other exanthemata either as to its contagiousness, limitation, or curability, we are forced to ask what, if any, plans have been proposed for the protection of the community? In the United States, except in a few cities in the south-west, absolutely none. Abroad the importance of the subject has been recognized, and *maisons de tolerance* are licensed by the State, and the inmates subjected to a strict and periodical examination. In the latest International Medical Congress (Paris, 1867; Florence, 1869; and Venice, 1873) resolutions were passed whereby sanitary surveillance of the prostitutes by the police was adopted as the first and foremost necessity. The idle charge, endeavored to be substantiated by figures, that the inspection of public women has only induced a greater amount of disease, is not worth refuting.

It has, undeniably, accomplished a wonderful amount of good in Continental cities, in the military towns of England, in insular garrisons like Malta, and recently and remarkably in Japan. On this point the universal testimony of naval and military officers cannot be impeached. Fournier, one of the ablest of living syphilographers, declared to Medical Director Cines that syphilis had been virtually stamped out of Paris, when the advent of the German army reintroduced it; but he

expressed his confidence that it would again be stamped out as before.

In ten years, the Surgeon-General of the Navy is authority for stating, the amount of venereal disease on the Asiatic station has fallen from 425·8 to 112·1 per thousand, a difference of 313·7 per thousand, due to the examination of prostitutes practised at Hong Kong and in Japan, and the seclusion of infected women in lock hospitals. The scandalous scenes which disgrace the chief thoroughfares of Liverpool and London and New York are no longer possible in cities like Paris and Lisbon and Hamburg—where public women are under police surveillance; nor is it true that clandestine prostitution attains such enormous proportions in places where the Gaukeiro or Yoshiwara confines the whore, as in Japan, or where the temples of Venus Meretrix, as in Marseilles, have their own secluded quarter, to be shunned by the virtuous, that it does in Philadelphia and Boston and Brooklyn, where the respectable woman is jostled in every street by unsuspected courtesans, and unfledged boys are lured to disease by young girls in the garb of decent poverty.

The first occasion of any systematic inspection of prostitutes attempted in the United States was by Colonel Fletcher, of the Surgeon-General's Office of the United States Army, who writes:

"In 1863, while I was on duty at Nashville, the question of periodical examinations of the prostitutes as a protection to the troops stationed at or passing through the city was referred to another medical officer and myself. We drew up regulations for the purpose, and for nearly three years the women were examined—at first every two weeks, but subsequently every ten days.

"Its results may be briefly stated thus:

"(1) The amount of venereal disease was markedly lessened, so much so that its occurrence came to be looked upon (absurdly, of course) as an imputation on the care of the examining surgeon. I have more than once known a company officer complain that a man was off duty for disease caught of such a girl, at such a time, and demand that she be sent to the hospital.

"(2) The women, who were at first rebellious, became quite

reconciled to the system. I have known them come to the hospital voluntarily, desiring to be examined for suspected disease."

The only additional plan that has been proposed, prior to 1886, in this country was that of the American Public Health Association, requesting the Legislatures of the several States to enact a law constituting it a criminal offence or misdemeanor to communicate, or to aid or abet in any way the communication of a contagious disease, such as small-pox or syphilis, and empowering and requiring health officials to establish such regulations as may be necessary for the prevention, discovery, treatment, and suppression of such diseases.

With this end in view, the New York Society for the Prevention of Contagious Diseases has been incorporated under the laws of the State of New York, and announces its objects to be as follows:

First. To endeavor to prevent the dissemination of syphilis and other contagious venereal diseases in the city of New York.

Second. To oppose all measures having for their object *the State regulation of vice;* and, by establishing *sanitary surveillance* without *legalization*, do away with any excuse for such *regulation.*

Third. To establish an infirmary for the reception and gratuitous medical and surgical care of such persons as may be afflicted with venereal disease.

That the medical profession recognize the necessity of some action being taken to arrest the spread of syphilis, is evidenced by the favorable comments of the medical press. The *Philadelphia Medical and Surgical Reporter*, June 26th, 1886, says: "The eminent utility of such a scheme cannot be doubted by any one who makes himself acquainted with the social life of our great cities, and will judge of the questions with an impartial mind thus brought forward. The official announcement sets forth clearly and succinctly the purposes of the society, and the needs which exist for its organization. Those who would acquaint themselves with the details of the plan of action proposed should write to the president or secretary, and receive a copy of the announcement. It will be found to contain many suggestions and much information on the work-

ings of such organizations. As its methods are such as to avoid the objections most generally urged against systems for the limiting of venereal contagion, we hope and trust that the society will be received with favor both by the medical world and the public at large, and that affiliated societies will be established in the other great cities of our Republic."

The *Boston Medical and Surgical Journal*, June 30th, 1886, says: "There is no doubt that syphilis has largely increased in this country in the last year, and no combined efforts are being made to check its spread. In fact, many, if not most, of our hospitals have regulations which forbid the admission of syphilitic patients, and hospitals for its special treatment hardly exist. Some such organization as the projected one in New York offers the only means by which to combat the growing evil, without exciting at the same time violent opposition; and though it would be very easy to point out great difficulties in the way of any marked success, every one who wishes well to his fellow-beings must, at least, hope that its first object will be attained."

The *Philadelphia Polyclinic*, July, 1886, says: "We have received the announcement of the New York Society for the Prevention of Contagious Diseases, an organization recently incorporated. The objects of the society, as stated, are of great moment and of difficult accomplishment. The firm stand against the licensing system, taken at the outset of the announcement, appears to be modified in the supplement by the acknowledgment that some form of supervision must be exercised over prostitutes. The objections to the licensing system, as carried out on the continent of Europe, on the part of the majority of the people of this country, are, for the present, insuperable; and the society proposes to attain a good result by a system of sanitary supervision of prostitutes. 'This sanitary surveillance of houses of prostitution,' we are told, 'can easily be enforced, for the reason that, in this country at least, prostitutes have learned that it is to their interest to keep well. Failure to do so can be attributed to their inability to pay a regular medical attendant.' Then follow some very just observations on the exorbitant charges frequently made for the treatment of venereal cases, in which connection we recall the remarkable clause in a now obsolete fee-bill that

twenty-five dollars extra fee in advance should be demanded in the treatment of venereal diseases. To remedy this, the society proposes to furnish gratuitously advice and medicine, and to employ agents to search among the afflicted for those who are unable to pay a physician. The society invites the co-operation of the profession at large, especially in the matter of tracing the source of venereal disease. Undoubtedly, a great amount of good may be done by assistance of this kind. Venereal disease traced to particular persons might be dealt with precisely as any other contagious or infectious disease—by seclusion of the infected persons. It is not unlikely that very early in its history the society will gain valuable experience, and we may look with great interest for its report of work."

That the accomplishment of the *first* object—viz., "the prevention of the spread of contagious venereal disease in the city of New York"—will prove a herculean task the officers of the society fully realize. Statistics carefully collated of the total number of venereal and syphilitic patients treated in 1873, in the city of New York, give a sum total of 61,705—nearly one in every fifteen of its men, women, and children—a number only dwarfed by comparison with London, where 100,000 poor alone are annually affected with syphilis. When, in addition, the number of prostitutes in the city of New York, estimated at 24,000, are taken into consideration, enough has been shown to establish the necessity of some plan being devised for the protection of the general public.

The practical work of the society, until experience may develop other and better methods, will be as follows:

The general public will be appealed to for the necessary funds; competent physicians will be appointed to act as agents, and paid for their services out of the funds of the society; blank reports will be sent to all of the physicians and medical institutions in the city of New York, their co-operation solicited, and a request made that whenever a patient comes to their office or any medical institution with which they may be connected infected with syphilis, they will endeavor to find out where the disease was contracted, and, if possible, the name of the infected person, and report to the society. Upon such information the agents of the society

will proceed to the designated house, ask permission to examine the suspected persons, and, when found, persuade them to submit to medical treatment.

The *second* object—viz., "the establishment of *sanitary surveillance* without *legalization*"—can only be accomplished by periodical examinations. For this purpose, a medical bureau has been established. This bureau will employ competent physicians (females preferred) to make periodical examinations of the inmates of houses where they have no regular medical attendant, or where the attendant is not willing to report to the society cases demanding treatment. Such a supervision, essentially medical, exercised by persuasion and reason, without any compulsion or terrorism, must result in bringing to the attention of the society many a diseased person who would otherwise be neglected and become a source of dissemination of contagious diseases. The officers of the society will, therefore, endeavor to facilitate medical inspections of this character by furnishing to this bureau the necessary blank reports, and aiding them in their work by every means within the society's power and legal responsibility.

The *third* and last object—viz., "the establishment of an infirmary for the reception and gratuitous medical and surgical care of such persons as may be afflicted with venereal disease"—is to be made the centre of the society's best work, as there is hardly a doubt that in this way the spread of the social scourge will be materially diminished. The want of such an institution in the city of New York has been felt for a long time. In view of the vast sums of money that are expended on hospitals and charities of all kinds, the Blackwell's Island Hospital has been the only one thus far that would admit patients of this class into their wards. Morally low as many of these girls and women may be, they would die before they would subject themselves to the degradation of going to this island hospital, associated in their minds with the Penitentiary, and, in fact, but one step in the social scale removed therefrom. The recent denouncement in the *Sunday Mercury*, July 4th, by the physicians attached to this hospital, of the inhuman management proves conclusively that institutions, as well as boards of health and sanitary bureaus, managed by public officials, controlled by political influence, must always

prove a source of corruption and mismanagement. This *exposé* of the treatment received by patients at this hospital only increases their repugnance, and the consequence will be a larger number of diseased persons in the community, acting as sources of contamination. While the work of the society is not limited to the class of persons mentioned, the infirmary being open to all, men and women, yet the *free treatment* thus established is especially designed for *females.* A man afflicted with specific disease can continue his legitimate calling and earn the money necessary to pay his physician ; if he be in destitute circumstances, the city dispensaries are always open to him. With women it is entirely different, as in the majority of cases their income ceases when they become diseased. Unable to pay a physician, they feel reluctant to enter the public dispensary, and subject themselves to the exposure, degradation, and very frequently the coarse and insulting language of the young practitioner who treats them.

With this presentation of the modern views regarding syphilis—its contagiousness and sources of contamination, and the prevention of its dissemination—members of the profession are assured that any modifications or additions that they may suggest will be cordially received and acted upon by the society.

245 WEST FIFTY-FIRST ST., N. Y., Aug. 3, 1886.

THE AIR OF THE SEA.—The air of the sea, taken at a great distance from land, or even on the shore and in ports when the wind blows from the open, is in an almost perfect state of purity. Near continents the land winds drive before them an atmosphere always impure, but at one hundred kilometres from the coasts this impurity has disappeared. The sea rapidly purifies the pestilential atmosphere of continents ; hence every expanse of water of a certain breadth becomes an absolute obstacle to the propagation of epidemics. Marine atmospheres driven upon land purify sensibly the air of the regions which they traverse ; this purification can be recognized as far as Paris. The sea is the tomb of moulds and of aërial schizophytes.—*MM. Moreau and Miquel.*

THE AMERICAN MEDICAL EDITORS' ASSOCIATION.

THIS Association met at the St. Louis Club Monday evening, May 4th, 1886. There were present the representatives of twenty-two periodicals (not including, to our sincere regret, THE SANITARIAN), and a choice sprinkling of ex-journalists and other congenial spirits.

The President of the Association, Dr. H. O. Walker, of Detroit, delivered an excellent address, which we hope to find space for entire, or at least a very full abstract of, hereafter, for THE SANITARIAN has its full share of what he so aptly calls "stuffed list" of patrons—the dead-beats who fill their office tables with sample copies, or do worse—order journals sent and then refuse to pay for them, in promotion of their false pretences to interest in progressive knowledge. He also made some very pertinent remarks with regard to exceptional advertisements under the code of ethics, failing, however, as the code does, to make any distinction between secret or patent medicines and proprietary medicines.

We have before taken occasion to remark that certain proprietary medicines of known composition, and compounded by chemists of good repute, should not, in our judgment, be classed in the same category as secret medicines. After the President's address, the following officers were elected for the ensuing year: *President:* J. V. Shoemaker, Philadelphia; *Vice-President:* Dudley Reynolds, Louisville; *Secretary:* William Porter, St. Louis. Thereupon the business meeting adjourned, and sat down to the banquet tendered by the Medical Press and Library Association.

The President of the Association, Dr. William Porter, greeted the assembly with a charming address, which he happily ended by introducing Dr. J. N. Love, who, true to his name and nature, showed himself to be a master of laconic medical literature, well seasoned with wit and humor, and delightfully appeasing to editorial appetites for the kind of knowledge there dispensed.

EDITOR'S TABLE.

THE NATIONAL BOARD OF HEALTH is at last suspended, Congress having adjourned without making any appropriation of funds for its continuance. The temporary exemption of the country from an epidemic of yellow-fever for the short period of nine years, so effectually brought about by the National Board of Health in 1879, appears to have had the effect of rendering leading Congressmen purblind to the most ordinary knowledge of that disease. Unfortunately, notwithstanding the increased strength of local and State Boards of Health, to which the National Board gave great impetus by its material aid and investigations into the nature of epidemic diseases, yellow-fever is not only annually menacing our seaports and obstructing commerce, but other epidemic diseases are abroad and liable to introduction in the United States as in other countries, in default of a vigilant health service, which the most enlightened nations have learned by experience to know contributes more to the happiness, pecuniary economy, and general well-being of the people than any other branch of civil government. But of this Congress seems not yet to have taken any account. It has forgotten the ravages of yellow-fever in 1878, which gave rise to the National Board of Health, which did so much to crush it out, and it appears to have paid no attention whatever to the means by which this was effected—the inauguration of a system of sanitary inspection of steamboats and railroads; the modification of quarantines, rendering them less obstructive to commerce; the establishment of refuge stations for infected ships; the care of persons affected with infectious diseases, and the speedy disinfection of vessels and merchandise, in the *promotion* of commerce, as far as practicable, consistent with safety to the public health. These are measures which would appear to have commended themselves to the common-sense of Congressmen as well as to other people, to say nothing of the important scientific investigations into the nature of epidemic diseases generally, with a view to their prevention.

Would that there was good reason to think that yellow-fever, small-pox, and other epidemic diseases, which the National Board so successfully contended against during the short period it was sustained, are not liable to occur again and again under circumstances which Congress, in its want of wisdom, invites! That like causes will produce like effects is a truism which even Congress will hardly attempt to gainsay. That the State and local Boards of Health, as at present organized throughout the country, in their independent relations to each other, are competent to contend against the introduction of epidemic diseases in the future, all of their past history contradicts; and that, without that concentration of effort which a national direction and supervision only is competent to exercise, the country is continually liable to the introduction of epidemic diseases, all the knowledge we have of them fully justifies. The recurrence of another devastating epidemic of yellow-fever or of some other epidemic disease will probably have the effect of reviving a national health service; nothing less, apparently, can divert the attention of Congress from the all-sufficiency of politics to every interest.

RAG IMPORTERS OBSTRUCTING COMMERCE.—Like the fox which lost its tail, the rag importers having failed to gain the assistance which they sought from the Chamber of Commerce in their effort to make it appear that old rags imported from infected places are no more dangerous than other merchandise, claim now to have gained an important advantage of the health authorities by a new order from the Treasury Department, that,

"All old rags imported into the United States in vessels which have passed local quarantine at the port of importation will be admitted to entry in the same manner as other imported commodities—that is to say, without requiring special permits from health officers as to their landing. The fact that the vessel has passed quarantine will be considered as sufficient evidence that her entire cargo is free from infection."

Under this new order the effort of the rag merchants will be to make old rags more than ever before convenient filling-in as part, instead of entire cargo, and the practical result will be to increase the number of detentions of vessels and the frequency of unlading in quarantine.

The fact that a vessel is in part laden with old rags will be considered by all careful health officers as sufficient evidence that her entire cargo has been subject to infection. Even merchandise of the optional class, such as silks, linen, etc., not ordinarily subject to infection, as part cargo with infected merchandise, becomes dangerous, and consequently subject to the same restrictions as old rags and other merchandise of the obligatory class.

The new order is decidedly a backward step—obstructive, instead of promotive of commerce.

New quarantine regulations in Canada, under date of August 6th, order that,

"Rags shall not be allowed to land at any port in Canada, except at a port which is one of the regularly organized quarantine stations (Grosse Isle or Rimouski).

"Rags shall not be allowed to enter or pass beyond the limits of the quarantine grounds until disinfected by such process or processes as shall be ordered by the minister of agriculture, or unless specially directed by the quarantine medical officer."

SEWER-GAS PREVENTION.—Attention is invited to two advertisements of recent inventions in this issue for the prevention of the introduction of sewer-gas—"The Standard Sewer-Gas and Back-Water Trap," adapted to main, waste, or sewer-pipes of all sizes, and "McClellan's Anti-Syphon Air Inlet," adapted to the waste-pipes of wash-basins, bath-tubs, wash-tubs, sinks, etc. The "Sewer-Gas and Back-Water Trap" (as may be observed by reference to the cut) is intended to protect the house fixtures against the gas pressure from the main house drain, or against that which emanates from the sewer. The valve by which it operates is admirably adjusted, and easy of access and release in case of possible obstruction.

The "Anti-Syphon Air Inlet" is a device to admit a free flow of fresh air into the waste-pipe at the time of outflow, as a means of preventing the trap from being syphoned—an economical and efficient substitute for the vent-pipe hitherto deemed to be essential and required by plumbing regulations to prevent trap syphonage. The following tests of this invention, recently made in the plumbing establishment of Andrus

& Denton, Paterson, N. J., appear to confirm what is claimed for it:

An iron pipe 2 inches in diameter and 26 feet high was connected at its upper extremity by a 2-inch valve to a 20-gallon tank having a Y-branch 11 feet below the tank.

Experiment 1.—A 1½-inch S-trap having a 3½-inch seal was inserted in the Y-branch, with the vent closed. One flush of 5 gallons completely syphoned the trap, leaving less than a tablespoonful of water in the trap.

Experiment 2.—The vent of this trap was opened, and to it was attached 15 feet of inch iron pipe having 1 half-circle curve and 1 right angle. Three flushes of the pipe completely destroyed the seal of the trap.

Experiment 3.—The ventilating-pipe was removed and a McClellan anti-syphon air-inlet was attached to the trap. The pipe was then flushed as before, and resulted in a loss of $\frac{5}{16}$ inch of the seal. Four subsequent flushes showed a further loss of ¼ inch, or a total loss of $\frac{9}{16}$ inch as the result of the 5 flushes. The pipe was again flushed 5 times in succession, no water having been added to the seal during any of the 10 flushes, and no further loss occurred. It should be remembered that the inverted cup-valve offers resistance equal to ¼ inch of the seal of the trap, and that this loss must always occur whenever there is sufficient syphonic pressure to bring the inlet into action. The loss in the 10 flushes amounted to only $\frac{5}{16}$ inch beyond the loss required to bring the inlet into action, while the same trap under exactly similar circumstances, ventilated as described, lost its seal with 3 flushes.

Experiment 4.—The trap was removed, the Y-branch closed, and a mercury gauge inserted. The pipe was flushed several times, and resulted in raising the mercury in the gauge about 14 inches, showing a vacuum pressure of about 7 pounds to the square inch.

These experiments were witnessed by the Health Inspector, Dr. William K. Newton, members of the Paterson Board of Health, architects, plumbers, and others. Dr. Newton writes: "The invention seems to prevent syphonage and at the same time admit fresh air into the waste-pipe. It is probable that the device will take the place of vent-pipes on waste-pipes from basins and tubs."

MEAT-POISONING.—A case of poisoning from dried beef has recently occurred in Mansfield, O. On Saturday afternoon, July 31st, Dr. R. Harvey Reed was called to the residence of Mr. James Ewing, and found him, his niece, Miss Eunice Ewing, and his nephew, James Ewing, Jr., suffering in a peculiar manner. On the evening before Mr. Ewing had bought some dried beef of his grocer, which had been partaken of for supper—the three members of the family named only being at home, all participating. Shortly after supper Miss Ewing was taken sick, and vomited violently all night. Mr. Ewing, who is sixty-nine years old, states that he did not feel well, and had a very disagreeable taste in his mouth. The young man, who has a strong constitution, did not experience any disagreeable effects.

The young lady was sick all night, but the cause was not suspected, and the following morning the same meat was placed on the breakfast-table. Soon after breakfast the young man was seized with violent vomiting, and presently all three were suffering in the same way. There was an accumulation of a peculiar substance in the stomach which came away in stringy, disagreeable masses, and kept the victim vomiting almost continuously. They soon began to suspect that they had eaten something poisonous, and blamed the meat for it.

Dr. Reed did what he could for their relief. The younger man recovered soon, and the young lady, who did not eat of the meat a second time, soon grew better; but Mr. Ewing had a very serious time. His condition was so bad that the doctor was called again at five o'clock. He was better later in the night, and is now no doubt out of danger. The doctor took the remaining meat. It did not have a healthy smell or appearance, and was evidently tainted. He thought the case similar to one reported some time ago by Dr. Barnhill, of Columbus, who attributes the poisonous effects to the formation of a substance which has been called *ptomaine*—the product of the putrefaction of animal matter.

On investigation, the meat was first alleged to have been put up in Detroit, but on further inquiry was found to have been procured from a "Chicago Packing House." It appears to have created a good deal of excitement among the grocers of Mansfield, and a laudable effort to trace it to the right source.

BITTER BREAD.—Complaint is frequently made by those who use baking powders that they leave in bread, biscuit, or cake raised by them a disagreeable, bitter taste. This taste is said to be due to the use of impure baking powders, caused either by their containing alum (introduced to make a cheap article), by the impure and adulterated character of other ingredients used, or from the ignorance of their manufacturers of the proper methods of combining them. These baking powders leave in the bread a residuum formed of lime, earth, alum, or other deleterious matters, not always, though frequently, tastable in the food, and by all physicians classed as injurious to health. The Royal Baking Powder is free from this serious defect. In its use no residuum is left, and the loaf raised by it is always sweet, light, and wholesome, and noticeably free from the peculiar taste complained of. The reason of this is because it is composed of nothing but absolutely pure materials, scientifically combined in exactly the proper proportions of acid and alkali to act upon and destroy each other, while producing the largest amount of raising power.

TYROTOXICON POISONING.—In a recent examination of some ice cream, the residue of what had been partaken of by a number of persons, and who soon afterward exhibited symptoms of arsenical poisoning, Dr. V. C. Vaughan, of the Michigan State Board of Health, reports the discovery of *tyrotoxicon*, the same which he discovered some time ago in poisonous cheese (see THE SANITARIAN, Vol. XV., p. 142). This proves, he says, that tyrotoxicon is due to the decomposition of milk, and may be developed in any milk which is kept in an impure atmosphere or unclean vessels. The germ seems to multiply very rapidly, and a small amount of milk so tainted will soon poison a whole can. Dr. Vaughan suggests that the same poison may have much to do with, if it is not, indeed, the actual cause, of cholera-infantum.

MORTALITY AND MORBILITY STATISTICS AT MOST RECENT DATES.

ALABAMA.—No State Board report. *Mobile*, population 31,295, reports 89 deaths for the month of June, of which 49 were colored. Twenty-eight were of children under five years

of age. The annual rate per 1000 was 28.44. There were 12 deaths from zymotic diseases and 19 from consumption.

CALIFORNIA.—Reports received from every county in the State agree that no serious sickness prevails. As might be expected, disorders of the bowels are very frequently experienced in many places, and if cholera had invaded our coast would be the cause of very serious alarm. We can, however, trace it to the prevailing summer heat, the consumption of fruit, and perhaps it may be an indication that the water supply of those towns where the disease is common has become polluted from surface or sewer drainage. *Cholera-Infantum* is noticed as of unusual frequency in Lemoore, Sacramento, Dixon, Monterey, Davis, Mariposa, Martinez, Wheatland, and Salinas City. *Diarrhœa and Dysentery* prevail to some extent in Merced, Tehama, Millville, Etna, Red Bluff, Lakeport, Willits, Castroville, Anderson, Sierra Valley, Pomona, Lincoln, Colfax, Gridley, Camptonville, Sonora, Davis, Martinez, Salinas, Cloverdale, Anaheim, Calistoga, Angels Camp, Galt, Hill's Ferry, and Fall City, which show how extensively the disease has been noticed. The type is evidently mild, as the mortality is exceedingly limited. *Measles* has appeared at Gridley, Dixon, and Wheatland. *Scarlet-fever* prevails to some extent in Truckee, Pomona, Downieville, and Williams. *Diphtheria and Croup* are still found in San Francisco, Amador City, Livermore, Monterey, Anderson, Etna Mills, Napa, Oakland, Watsonville, and Santa Cruz. *Whooping-cough* is prevalent in Millville, Colton, San Mateo, Anaheim, Colfax, Amador, Gridley, Live Oak, Galt, Jolon, and San Francisco. Dr. M. F. Price, of Colton, writes "that the disease is epidemic there, but of such a mild type that a physician's services are seldom needed." *Erysipelas* has been noticed in Lemoore, San Francisco, Willits, Igo, Anderson, Jolon, Sonora, Davis, Camptonville, Gridley, Truckee, and Livermore. The cases are all sporadic and mild in type. *Typhoid-fever* has been noticed in San Francisco, Oakland, Martinez, Williams, Fall River, and Sacramento. *Typho-malarial-fever* has been observed in Martinez, Amador City, Lemoore, Igo, Jolon, Anderson, and Millville. *Intermittent and Remittent-fevers* are prevalent in the lowlands and marshy

bottoms. The deaths reported for the month number 751 in a population estimated at 582,450—a percentage of 1.3 per 1000 for the month, or an annual rate of 15.6.

San Francisco reports 397 deaths during June—of which 127 were under five years of age—in a population of 270,000, representing an annual death rate of 14.7 per 1000. From zymotic diseases there were 46 deaths; from consumption, 39.

CONNECTICUT.—Abstract of report for June: The total number of deaths registered in the ten cities was 378 as against 368 in May, being an excess of only 10. This mortality represents an annual death rate of 15.1 to the 1000 people.

Annual death rate: New Haven, 14.1; Hartford, 17.7; Bridgeport, 21.3; Waterbury, 13.1; Norwich, 13.5; Meriden, 12.5; New Britain, 11.3; Norwalk, 17.6; Middletown, 16; New London, 14.

The cities of Connecticut contain about two fifths of the whole population of the State. And the average death rate of the whole probably does not exceed that of the cities.

Consumption and pneumonia still predominate over other causes of death. A smaller mortality from some of the usual zymotic diseases is noticeable; thus in only one city did scarlet-fever prove fatal. There were no deaths from measles during the month. Only 9 fatal cases of diphtheria and croup in all the ten cities, and no deaths from typhoid-fever except in New Haven.

On the whole, the health of the State seems quite up to its usual standard.

New Haven reports for June 94 deaths in its population of 80,000, representing a death rate of 14.1 per 1000. The deaths of children under five years of age numbered 36. There were 16 deaths due to zymotic diseases, and 19 to consumption.

DELAWARE.—No State Board report. *Wilmington*, estimated population 55,800, reports 44 deaths during June, representing a ratio of 9.99 per 1000. Twelve deaths were of children under five years of age. From zymotic diseases there were 9 deaths, and from consumption 5.

THE DISTRICT OF COLUMBIA has an estimated population of 205,000, of which 136,000 are whites and 69,000 colored. There are reported for the month of June 388 deaths—193 whites and 195 colored—representing an annual death rate per 1000 of: Whites, 17.03; colored, 33.91; and for the total population, 22.71. From zymotic diseases there were 45 deaths among the whites and 36 among the colored—a total of 81. From consumption there were 76 deaths in all, of which 25 were whites and 51 colored.

GEORGIA.—No State Board report. *Savannah* reports for three months ending June 30th. Total deaths, 429, of which 124 were white and 305 colored. Of deaths under five years there was a total of 230, of which 68 were white and 162 colored.

The white population, estimated at 25,720, shows the annual rate of mortality per 1000 to have been 19.2; while the colored population, being estimated at 19,111, shows a mortality of 65.7 per 1000.

The total population of the city is 44,831, and the ratio of death per 1000 per annum is 42.4. From zymotic diseases there were 154 deaths—56 white, 98 colored (29 deaths were due to measles). Consumption caused 33 deaths—8 white and 25 colored.

ILLINOIS.—At the regular quarterly meeting of the Board, June 29–30th, Dr. John H. Rauch, the Secretary, reported the general health of the State for the quarter to have been unusually good.

Scarlet-fever of a mild type had been reported in the neighborhood of Venedy, Washington County; also at Danforth, Iroquois County, and cases still occur at Peoria.

Small-pox.—At the last meeting of the Board several cases of this disease were reported at Carmi, White County. In all there have been 13 cases and 3 deaths. At Crossville and Emma, in the same county, there were 20 cases and 6 deaths, and 7 cases and 3 deaths, respectively. With one exception all the cases occurred in March and April, and the disease is now exterminated. One case of varioloid was reported near El Dorado, Saline County; no further spread. At Champaign 7 cases were reported and 1 death. The disease was

brought from Greenfield, Ind., in March. The case that died had never been vaccinated. All the cases were in one house; no spread. Another group of cases are reported in Sycamore Township, DeKalb County. In all there were 7 cases and 1 death. Disease was contracted on a Lloyd steamer from Bremen to New York, from a child who had small-pox on the voyage. The case that died had never been vaccinated. Another case, a Norwegian immigrant, was reported at Boone, Boone County; contracted the disease on steamer. Two cases were removed from the steamer to the quarantine station at Grosse Isle, below Quebec. The patient was seen on June 2d, fourteen days after arrival in this country, and five days after she was taken sick. On the day before the eruption made its appearance she was delivered of an eight-months' child, which died on June 10th, covered with well-marked small-pox; so far no spread has occurred. On June 4th a case of varioloid was reported at Lake Forest, in an immigrant from Sweden, who had arrived at New York on the City of Chester two weeks prior to the appearance of the eruption. *She had a certificate of vaccination from the surgeon of the steamship, although she had not been vaccinated since infancy.*

Glanders.—One case, a female, with recovery, reported by Dr. C. N. Cooper, county physician of Kane County, under date of June 11th, 1886. She contracted the disease from her husband, who died of it near Elgin about two years ago.

Chicago, with a population of 630,000, reports for the month of June 1095 deaths, representing an annual death rate of 20.86 per 1000. There were 548 deaths of children under five years of age. There were 301 deaths from zymotic causes—110 being from diarrhœal diseases; from consumption, 113.

Rock Island, with 11,650 inhabitants, reports for four weeks ending June 26th, 11 deaths *and* 6 *still-births.* Of children under five years of age there were 4 deaths. Annual death rate per 1000, 12.12.

LOUISIANA.—*New Orleans*, with a population of 238,000—173,500 whites and 64,500 colored—reports for the month of June 348 deaths of whites, showing a ratio per 1000 of 24.06, and 194 deaths of colored, showing a ratio of 36.09 per 1000; total deaths, 542, with a ratio per 1000 of 27.32. Of deaths under five years there were, of whites and colored, 254.

The deaths from zymotic diseases numbered 115—whites, 77; colored, 38. The deaths from consumption numbered 69, of which 34 were whites and 35 colored. Diarrhœal diseases caused 67 deaths.

MICHIGAN.—For the month of June, 1886, compared with the preceding month, the reports indicate that intermittent-fever increased in prevalence. There was no marked increase or decrease of any other disease.

Compared with the preceding month, the temperature in the month of June, 1886, was higher, the absolute humidity was considerably more, the relative humidity and the day ozone were about the same, and the night ozone was more.

Compared with the average for the month of June in the eight years, 1879–86, remittent-fever, measles, intermittent-fever, pneumonia, bronchitis, and diphtheria were less prevalent in June, 1886.

For the month of June, 1886, compared with the average of corresponding months for the eight years, 1879–86, the temperature was slightly lower, the absolute and the relative humidity were about the same, the day ozone was more, and the night ozone was considerably more.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of June, 1886, at 47 places, scarlet-fever at 48 places, typhoid-fever at 6 places, measles at 16 places, and small-pox at 3 places.

Reports from all sources show diphtheria reported at 4 places less, scarlet-fever at 9 places more, typhoid-fever at the same number of places, measles at 5 places less, and small-pox at 3 places more in the month of June than in the preceding month, May, 1886.

At the regular quarterly meeting of the Board, July 13th, Dr. Henry F. Lyster, of Detroit, presented an analysis of 500 deaths, at ages between 18 and 65, occurring in the Michigan Mutual Life Insurance Company during the first 18 years of its existence. The chief causes of death, in order of frequency, were: Lung consumption, 98; pneumonia, 62; typhoid-fever, 47; apoplexy, 39; heart-disease, 23; cancer, 22; Bright's disease, 16; and acute miliary tuberculosis, or quick consumption, 16. In the 98 deaths from consumption, light weight and small expansion of chest correlated with considerably

more than average height—a fact which may be of occasional service to examiners in deciding upon risks, and which is of especial interest to all individuals of this character, who should take special pains to avoid predisposing causes of consumption, and especially to secure better nourishment and less waste, so as to make the weight nearer the normal average. The average age of the 47 typhoid-fever decedents (38.5 years) is interesting as added proof, if any were necessary, that this largely preventable disease strikes down men in the prime of life, when they are physically and mentally at their best. The relatively large number of deaths from this preventable disease (nearly ten per cent of all) also brings into clear relief the pecuniary interest of associations of this character and of the State at large in public health work, which, by removing causes of disease, aims directly at increased longevity and greater material prosperity.

Dr. Victor C. Vaughan submitted a report in detail on the presence of *tyrotoxicon* in ice-cream and milk, for which we shall make room in full in a future number. Dr. J. H. Kellogg made a report on the sanitary condition of the court-house and jail adjoining at Stanton, Mich., which showed a very defective method of ventilation, aggravated by the opening of the foul-air shaft of cesspools into the building, so that whenever the air currents in the shaft are downward the emanations from putrefying excreta are driven into all parts of the building.

Dr. Henry B. Baker, Secretary of the Board, in his summary for the quarter, reported three outbreaks of small-pox—1 case at Bell Branch, Wayne County, 2 cases in Detroit, and 7 cases in Stalwart, Chippewa County.

Compared with the preceding quarter (January, February, and March), reports received from all sources show the number of places at which diphtheria is reported to have decreased by an average of 8 places per month, scarlet-fever to have decreased by an average of 6 places per month, measles to have increased 7 places per month, typhoid-fever to have decreased 6 places per month, small-pox to have increased 1 place per month, a marked increase of diarrhœa and cholera-morbus, and a marked decrease of pneumonia, tonsilitis, bronchitis, and influenza in the second quarter of 1886.

A comparison of the meteorological conditions of the second quarter of 1886, with the average of the corresponding quarters in the eight years 1879–86, shows that in 1886 the temperature was slightly higher, the absolute humidity was slightly more, the relative humidity and the day and the night ozone were more than in the average second quarter of the preceding eight years.

Detroit reports for the month of June 285 deaths in a population of 175,000, of which 73 were under five years of age. This mortality represents an annual death rate of 19.8 per 1000. There were 96 deaths from zymotic diseases and 32 from consumption.

Worse than the Small-pox.—While Dr. O. W. Wight, the Health Officer of Detroit during the threatened epidemic of small-pox, was, as ever, assiduous and forcible in his effort to ferret out and isolate every case at the earliest possible moment, as the first necessity for preventing its spread, he encountered an endemic threatening his own existence—an endemic which, like ignorance of the first symptoms of dangerous epidemic diseases and the causes which give rise to them and promote their spread, is the common outcome of the ability to formulate theoretical rules without any practical knowledge of the subject to which they relate. But, fortunately for Detroit, Dr. Wight is an old health officer of the practical kind, one who has encountered small-pox and the conceits of officials and many well-meaning persons who have thought they knew more about the exercise of his functions than he did himself, long before he was called to the duty of formulating and conducting the health service of Detroit. In short, while intent upon the duties of his office, certain members of the Board of Health, of which he is the executive officer, seemed to have jumped to the conclusion that they were executive officers, and that it was their duty to direct and to supervise the work of their own specially chosen agent—chosen because of his acknowledged competency—to conduct the health service: a conceit and mistaken zeal about as unreasonable as it would be, for example, for the Secretary of the Navy to undertake to instruct an admiral in seamanship. But we are glad to know, as we go to press, the battle is over and the victory won; that Dr. Wight, who

tendered his resignation as health officer rather than submit to the false position into which two of the three medical members of the Board of Health endeavored to place him, has by the public voice, through its highest official representatives, been induced to withdraw his proffered resignation, and is as intent as ever in his efforts to protect the public health from unjustifiable official interference with the exercise of his functions, as obstacles to the promotion of health, no less than the material things and conditions in intimate relations with disease.

Sanitary Conventions.—The time for holding the Sanitary Convention at Coldwater, under the auspices of the Michigan State Board of Health, has been changed from September 23d and 24th to Thursday and Friday, September 9th and 10th, 1886. L. A. Warsabo, Secretary, Coldwater, Mich.

A Sanitary Convention will also be held in Big Rapids, Mich., on Thursday and Friday, November 18th and 19th, 1886. F. J. Grover, M.D., Secretary, Big Rapids, Mich.

MINNESOTA.—In our July summary from public health in Minnesota, under date of May 1st, infectious diseases reported for the month of "May" should be April instead. For the month of May, now before us, infectious diseases reported were: *Diphtheria*, 11 cases, 1 death; *Scarlet-fever*, 38 cases, 10 deaths.

Diseases of Animals.—Glanders remaining on hand isolated, or not accounted for at first of month, 37; reported during the month, 18; killed, 13; released, 2; isolated, 3.

At the regular meeting of the Board in Minneapolis, June 18th, a committee was appointed to inspect the slaughter-houses and rendering establishments at Minneapolis and St. Paul, and ordered to report upon the general question of abattoir construction for villages and cities, with power to act. The Secretary was instructed to repeat the preparations which he made last season, with a view of the possible advent of cholera; to take the steps required by law for the conservation of streams and other sources of water-supply, and to obtain reports and make examinations of the public water supplies by water companies. He was further instructed to use the authority of the Board for the support of local Boards in the enforcement of the law relating to infectious diseases of animals, particularly glanders.

St. Paul reports 115 deaths during June in a population of 120,000, representing an annual death rate of 10.4 per 1000. There were 70 deaths of children under five years of age. There were 44 deaths from zymotic diseases and 4 deaths from consumption.

Minneapolis, with a population of 129,200, reports for the month of June 102 deaths, of which 58 were under five years of age, representing an annual death rate of 10.07 per 1000 inhabitants. From zymotic diseases there were 27 deaths, and from consumption 16.

MISSOURI.—No State Board report. *St. Louis* reports for June, in a population of 400,000, a mortality of 648, representing an annual death rate of 19.44. There were 328 deaths under five years of age. From zymotic diseases there were 190 deaths, and from consumption 62 deaths.

MARYLAND.—No State Board report. *Baltimore* reports for four weeks ending June 26th, 675 deaths in a population of 417,220, representing an annual death rate of 21.06 per 1000. There were 349 deaths under five years of age. Deaths from zymotic diseases numbered 214, and from consumption 79.

NEW JERSEY.—No State Board report. *Newark*, with a population of 157,485, reports 272 deaths during June, showing an annual rate per 1000 of 20.65. Of children under five years of age there were 80 deaths. There were 40 deaths from zymotic diseases and 30 from consumption.

Hudson County reports 423 deaths during May in a population of 250,734, making its annual rate per 1000, 20.2. There were 161 deaths under five years of age. There were 34 deaths from zymotic diseases and 60 from consumption.

OHIO.—This new Board seems to have difficulty in getting under headway. By latest information, Dr. C. A. Probost, of Columbus, has been elected Secretary *vice* Dr. Guy B. Case—the third effort to obtain a secretary. Presumably the obstacle in the way of Dr. Case was, as in the case of Dr. Ashmun, required residence in Columbus, with insufficient salary to justify removal. Dr. Probost, being a resident of the capital already, overcomes that difficulty, and though without record as a practical sanitarian, it is sincerely to be hoped he may

prove to be qualified in all important particulars. Meanwhile much needful work languishes.

Toledo reports for June 59 deaths in a population estimated at 70,000, making its annual death rate for the month 8.41 per 1000. Eighteen deaths were of children under five years of age. There were 9 deaths due to zymotic diseases and 10 to consumption.

NEW YORK.—*Bulletin* for the month of June reports mortality 6306, of which 35.3 per cent were under the age of five years. From zymotic diseases there were 1220 deaths, a ratio per 1000 total mortality of 193.65. The ratio per 1000 of deaths from typhoid-fever is 6.20; from diarrhœal diseases, 73.80; from croup and diphtheria, 60.32. Temporary outbreaks of the latter disease appear at various localities. Whooping-cough has been prevalent through the month at North Hempstead, the total mortality for the month being about the same as in May. Scarlet-fever is reported as prevalent in Hudson. Almost total abatement of malarial diseases is reported from Westfield, Richmond County. No spread of small-pox in Gravesend has occurred, and none is reported elsewhere save in New York City. From consumption the ratio of mortality is 144.60 per 1000 deaths from all causes; and 223.88 per 1000 deaths under the age of five years. The combined death ratio per 1000 from zymotic diseases, consumption, and puerperal diseases is 333.65. From acute respiratory diseases, 99.36 deaths per 1000 from all causes.

New York City, with a population of 1,439,000, reports 2722 deaths—1166 being under five years of age—showing an annual rate per 1000 of 22.7. There were due to zymotic diseases 655 deaths, and to consumption 423 deaths. There were 2 deaths from small-pox.

The infant mortality during hot weather this year has been greater than usual for the second week in July—683, as against 542 last year—attributed by the Health Department to the parsimony of the Board of Apportionment in not making the usual extra $5000 appropriation for the midsummer medical attendance to the sick children of the indigent. THE SANITARIAN has before shown (Vol. 11, p. 146) that this midsummer inspection, which has been practised for the last ten

years, is the most tangible life-saving service in which the Health Department of New York has ever engaged, giving—as shown by its records in comparison with a corresponding period before it was instituted—an average saving of 725 lives for every six weeks it has been employed. It is certainly surprising that the Department, with such a record and with an inspection force at command, cannot find *some* means, even by the partial suspension of other work for six weeks, to continue this service, notwithstanding the parsimony of the Board of Apportionment.

Brooklyn, with 690,000 inhabitants, had 1097 deaths, of which 470 were under five years of age, making its death rate per 1000, 19.07. From zymotic diseases there were 208 deaths; from consumption, 149.

Small-pox.—Total number of cases reported June 25th to July 30th (date of latest case), 28; deaths, 7.

The infant mortality in Brooklyn, as in New York, though to much less extent, greatly increased during the hot weather in July. But to protect the people in the tenement-house districts against its continuance, and to relieve the distress consequent upon it, Health Commissioner Otterson promptly organized, early in August, a special corps of medical inspectors to visit all tenements in search of sick infants who are without medical attendance, and to give all needful relief, in orders for medicine, food, fresh-air excursions to the seashore, etc.; to take cognizance of all unsanitary surroundings, and make prompt reports of the same, with a view to speedy removal.

The midsummer stench of Newtown Creek is again rampant, as usual, reminding Brooklyn of official permissions and omissions, which smell of epidemics to come, unless more efficient measures are taken than ever yet have been for the abatement of this nuisance. We need not stop to inquire into the history of this once open sewer, with its banks loaded with manure from New York, the "sunken lots" on its border filled in with Brooklyn garbage, the filth drainage of cow-stables, slaughter-houses and rendering establishments, and the drainage of numerous factories which have contributed to the foul soil of the banks and adjacent flats of Newtown Creek; all these conditions have been many times described in THE SANI-

TARIAN and the Brooklyn newspapers. It is equally unnecessary to describe the numerous false attempts made for the abatement of this nuisance by the State and local Boards of Health. Herein is comprised an area of not far from 2000 acres of marsh saturated with many years' accumulation of filth, with a creek running through it, but gradually filling up with the filthy silt, instead of being kept open and clean as a natural means of draining the low lands of the region, and thereby promoting the sanitary advantages of the neighborhood and the commercial facilities of the city.

We had occasion to state to the committee of the State Board of Health, seven years ago, when the State Board appeared to have earnestly taken the subject in hand: "If all the causes which contribute to it were abated to-day, so filthy is the soil of this region that, if left to time alone, the stench will continue for several years to come." The remark still holds good, but, owing to the encroachment of the population, the necessity of measures which shall have for their objects the total abatement of all causes which contribute to this nuisance and to render the region fit for human habitation, has greatly increased. Moreover, it is far from being a mere local concern of the few thousands of people who live in the vicinity. It concerns the whole population of Brooklyn, besides the many thousands of people from elsewhere who are constrained to make this abominable stench the by-way to the health resorts—indeed, to the whole interests of Long Island—by reason of the railroad terminus. Arrayed against all these interests a handful of rich stench-mongers have persistently maintained their ground for thirty years! And they have even had official encouragement in Brooklyn, on the plea of prior occupancy—against the growth and welfare of the city. Surely it is not too much to hope that, under the authority which the Health Department of Brooklyn and the State Board of Health possess, and the courage with which His Excellency the Governor is credited, this disgraceful nuisance may be speedily overcome.

Buffalo, with a population of 202,818, reports (for four weeks ending June 26th) 230 deaths—85 under five years of age—making its death rate 14.8. From zymotic diseases there were 21 deaths, and from consumption 44 deaths.

Rochester reports 101,000 inhabitants and 132 deaths—40 under five years of age—showing its annual death rate to be 15.68. Zymotic diseases caused 17 deaths, and consumption caused 23 deaths.

NORTH CAROLINA.—Abstract from *Bulletin* reports from county superintendents of health for May, 1886.

Buncombe.—Dr. W. L. Hilliard, Asheville, acute bronchitis, measles, whooping-cough, and rötheln have prevailed in city and different portions of county. *Burke.*—Dr. J. L. Laxton, Morganton, reports 4 cases of measles and 3 of typhoid-fever. Dysentery and diarrhœa have prevailed slightly. *Catawba.*—Dr. George H. West, Newton, reports 15 cases measles, 3 whooping-cough, and 11 typhoid-fever. Bronchitis, dysentery, and diarrhœa in Newton and vicinity. Three deaths from diarrhœa. *Cleveland.*—Dr. J. C. Gidney, Shelby, measles and whooping-cough have prevailed; 1 death from dysentery and 2 from whooping-cough. *Columbus.*—Dr. Isaac Jackson, Whiteville, diarrhœa epidemic in many portions of the county. *Cumberland.*—W. C. McDuffie, Fayetteville, 15 cases measles, 30 whooping-cough, 4 scarlatina, and 4 typhoid-fever, and bowel diseases in almost all portions. *Davidson.*—Dr. R. L. Payne, Jr., Lexington, 100 cases whooping-cough, 2 scarlatina, 5 diphtheria, and 3 typhoid-fever. Rötheln and whooping-cough have prevailed in nearly all portions of county. *Durham.*—Dr. A. G. Carr, Durham, dysentery has prevailed in county, town, and surrounding country. *Forsyth.*—Dr. D. N. Dalton, Winston, a good many cases whooping-cough, with a few complicated deaths. *Franklin.*—Dr. E. S. Foster, Louisburg, whooping-cough has prevailed in different portions of county. *Gaston.*—Dr. E. B. Holland, Dallas, dysentery and malarial-fever have prevailed to some extent; there has been an epidemic of cholera among fowls. *Greene.*—Dr. W. C. Galloway, Snow Hill, dysentery has prevailed throughout the county. Several truly malignant cases and some deaths. *Guilford.*—Dr. W. P. Beall, Greensboro, measles and dysentery have been prevalent throughout the county. *Iredell.*—Dr. M. W. Hill, Statesville, measles, whooping-cough, scarlatina, dysentery, and diarrhœa. *Johnston.*—Dr. J. G. Rose, Smithfield, dys-

entery in almost all portions of county. *Jones.*—Dr. Rom. A. Whitaker, Trenton, dysenteric troubles have prevailed throughout the county. *Lincoln.*—Dr. J. M. Lawing, Lincolnton, dysentery and cholera-morbus have prevailed. *McDowell.*—Dr. J. H. Gilkey, Marion, 4 cases measles, 1 typhoid-fever. *New Hanover.*—Dr. F. W. Potter, Wilmington, 1 case each of typhoid, pernicious malarial, and hemorrhagic malarial-fever, and a great many of whooping-cough and rötheln. *Pender.*—Dr. W. T. Ennett, Burgaw, 50 cases rötheln, 50 or more whooping-cough, 4 diphtheria, 5 hemorrhagic malarial-fever; malarial-fever has prevailed in the lowlands along river. *Pitt.*—Dr. J. T. Sledge, Greenville, several cases of whooping-cough have occurred; dysentery has prevailed to a considerable extent; there has been an epidemic of hog-cholera. *Richmond.*—Dr. J. M. Stansill, Rockingham, there has been a number of cases of dysentery of a mild type and a few cases of whooping-cough. *Robeson.*—Dr. R. F. Lewis, Lumberton, no contagious diseases, save a few cases of whooping-cough. *Rowan.*—Dr. J. J. Summerell, Salisbury, many cases of whooping-cough and some of typhoid-fever have occurred, and bowel complaints among children are beginning to appear. *Sampson.*—Dr. James A. Stevens, Clinton, malarial fevers, diarrhœa, and dysentery have been the prevailing diseases during May. *Tyrrell.*—Dr. Ab. Alexander, Columbia, 12 cases measles and 6 typhoid-fever. *Union.*—Dr. W. C. Ramsay, Monroe, diarrhœa in a mild form has prevailed to a slight extent. *Vance.*—Dr. John C. Jacobs, Henderson, 1 case of typhoid-fever. *Warren.*—Dr. P. J. Macon, Warrenton, "a few cases of typhoid-fever." Diarrhœa, dysentery, and malaria have prevailed throughout the county. *Watauga.*—Dr. W. B. Council, Boone, 10 cases of measles, 50 of whooping-cough, and 1 typhoid-fever have occurred. *Wayne.*—Dr. James Spicer, Goldsboro, diarrhœa and dysentery have prevailed.

PENNSYLVANIA.—The Board has adopted the *Annales of Hygiene* as its official organ, which first appeared as a feeble publication of sixteen pages about two years ago, followed by five additional numbers. But under date of July 1st, ultimo, it appears ("Vol. I., No. 7") greatly invigorated, as the

"official organ of the State Board of Health of Pennsylvania," edited by Joseph F. Edwards, M.D. (assistant editor *Medical and Surgical Reporter*), filled with a portion of the papers read before the recent Sanitary Convention in Philadelphia. The August number is also before us, and the convention papers continued; and besides, editorial notes and excerpta of general interest to sanitarians. Dr. Edwards is a member of the State Board, and will no doubt make the most of its work, so auspiciously initiated by the convention, to rouse the interest and secure the co-operation of all persons interested in its progress by means of the *Annales*. But in neither of the numbers before us is there any account of work performed by the Board since the convention three months ago.

Philadelphia, with an estimated population of 971,363, reports 1320 deaths for four weeks ending June 26th, of which 488 were under five years of age. This mortality represents an annual death rate of 17.9 per 1000. From zymotic diseases there were 195 deaths, and from consumption 167.

Pittsburgh reports for the four weeks ending June 26th, 372 deaths in a population estimated at 200,000, of which 236 were under the age of five years. From zymotic diseases there are reported 41 deaths, and from consumption 27 deaths. Annual rate, 18.6.

Erie, with an estimated population of 33,215, reports for the month of June 32 deaths, of which 16 were under five years of age. Annual death rate per 1000, 9.96. From zymotic diseases there are reported 10 deaths, and from phthisis 6 deaths.

RHODE ISLAND.—No State Board report. *Providence* reports for June 165 deaths in a population estimated at 120,000, of which 41 were less than five years of age. This mortality represents an annual death rate of 16.5 in 1000 of population. Of the causes of deaths, there were from zymotic diseases 26, and from consumption 37.

TENNESSEE.—*Bulletin* reports the principal diseases, named in the order of their greater prevalence, in the State for the month of June, were: *Malarial-fever, Dysentery, Cholera-morbus, Diarrhœa, Typhoid-fever, Pneumonia, and Catarrhal-fever.*

Whooping-cough is reported in the counties of Decatur, Dyer, Hancock, Hawkins, Lauderdale, Maury, Montgomery, Shelby, Sullivan, and Wilson. *Measles* in Hamilton, Hardeman, and Wayne. *Mumps* in McMinn and Polk, and *Diphtheria* in McMinn.

Death Rates.	Chattanooga,	white,	30.35 ;	colored,	51.26 :	38.57
" "	Clarksville,	"	9.60 ;	"	16.00 :	12.00
" "	Knoxville,	"	14.31 ;	"	30.00 :	17.69
" "	Memphis,	"	13.43 ;	"	39.57 :	22.55
" "	Nashville,	"	14.66 ;	"	31.63 :	20.79

The principal meteorological feature of June was the great and almost unprecedented amount of precipitation—7.24 inches, being at least 3 inches in excess of the normal mean for the month.

The mean temperature was 71°.54, about 2½° below that for June of last year, and slightly below the mean for June of the two previous years. The highest temperature was 93°, recorded on the 1st, and was 5° below the maximum recorded in June of last year, which was respectively 1° and 3° above the maximum points reached in June, 1883, and 1884. The lowest temperature was 48°, recorded on the 19th, and was 4° below the minimum of June, 1885, and 1° above that of the corresponding period of the two years previous. The monthly range of temperature was 45°, respectively 5°, 3°, and 1° less than the monthly ranges of June of the three preceding years, beginning with 1883.

VERMONT.—*Burlington* reports for the month of June a mortality of 20, an annual death rate per 1000 of population, 17.03. There were 12 deaths under five years of age. There were but 3 deaths from zymotic diseases and 1 from consumption.

VIRGINIA.—No State Board report. *Richmond* reports for June 147 deaths—78 white and 69 colored. The white population, estimated at 42,000, and the colored at 33,000, show the respective death rates to be 22.28 and 25.09 per 1000, and for the whole city 23.52. There were 62 deaths under five years of age. Zymotic diseases caused 26 deaths of whites and 10 deaths of colored, and consumption caused 7 deaths of whites and 12 deaths of colored.

Lynchburgh reports for four weeks ending June 26th, white population, 9420; colored population, 11,000; total, 20,420. Deaths, 46—13 white, 33 colored. Rate per 1000, white, 17.9; colored, 20.8; total, 19.3. Deaths under five years of age, 23. From diarrhœal diseases 13 deaths, and from consumption 7 deaths.

WISCONSIN.—No State Board report. *Milwaukee* estimates its population at 160,000. During the month of June there were 231 deaths, of which number 74 were under the age of five years. The annual death rate per 1000 represented by these figures is 17.33. Thirty-one deaths were from zymotic diseases and 17 from consumption.

MORTALITY STATISTICS ABROAD, and the annual death rate per 1000 for the *three months* ending June 30th, 1886, were as follows:

In 14 large English cities the average annual rate was 20.3. The lowest annual rate for the three months was in Hull, 16.6, and the highest in Dublin, 25.5. In the other cities the rates, ranged in order from the lowest, were as follows: Bristol, 16.7; Sheffield, 17; London, 17.1; Bradford, 18.2; Leeds, 19.1; Birmingham, 19.6; Edinburgh, 19.7; Liverpool, 20.0; Newcastle, 20.9; Belfast, 24.2; Glasgow, 24.7; Manchester, 25.2.

Amsterdam, 23.3; Rotterdam, 22.9; Hague, 19.9; Paris, 24.9; Lyons, 24.2; Marseilles, 37.7; Bordeaux, 30.2; Nantes, 23.9; Havre, 30.0; Rheims, 26.4; Nice, 26.3; Berlin, 25.8; Hamburg, 28.4; Breslau, 32.5; Munich, 31.0; Dresden, 25.9; Leipzig, 21.9; Cologne, 25.8; Frankford, 21.8; Hanover, 21.0; Bremen, 20.4; Dusseldorf, 23.8; Dantzig, 27.6; Nuremberg, 38.6; Stuttgart, 21.6; Strasburg, 30.5; Aix-la-Chapelle, 29.7; Vienna, 29.0; Buda Pesth, 38.8; Prague, 37.9; Trieste, 28.8; Copenhagen, 23.9; Stockholm, 23.4; Christiana, 19.8; St. Petersburg, 36.5; Warsaw, 29.5; Odessa, 35.0; Venice, 38.5; Bucharest, 29.4.

INFECTIOUS DISEASES ABROAD, at most recent dates, as follows:

Cholera.—Deaths reported for the week ending July 17th: In Trieste, 19; Brindisi, 23; Latiano, 63; San Vito, 19; Govigoro, 15. July 10th: Venice, 6. August 8th (telegraphic): On the Adriatic, in Barletta, 165 new cases and

68 deaths; in Ravenna, 29 new cases and 13 deaths; in Bologna, 12 new cases and 6 deaths; and in other infected districts in Italy, 52 new cases and 15 deaths; in Trieste, 6 new cases and 2 deaths. Advices from Hong Kong to July 13th and Yokohama to July 22d; "Cholera is now raging in the cities of Yokohama and Tokio. In the former the disease is worse than ever before known. Between July 15th and 20th the cases averaged over 100 daily, and the deaths 50. There is every reason to fear the disease will spread further, as the atmospheric conditions at the present are favorable to the propagation of epidemics. The weather is the hottest experienced since 1871. Up to date only two foreigners have been attacked by the disease, and both of these, whose names are unknown, died. The better classes of foreigners and natives are comparatively exempt from the disease."

Small-pox.—Deaths reported for the week ending July 17th: In Liverpool, 1; Glasgow, 1; Paris, 3; Anvers, 1; *Marchienne-au-Pont*, 3. Month of June: Marseilles, 138; Bordeaux, 2; Nice, 4; Saragossa, 1; Barcelona, 1. Week ending July 10th: In Vienna, 2; Buda Pesth, 13; Prague, 2; St. Petersburg, 6; Warsaw, 2; Turin, 4. Month of May: In Milan, 8; Bologna, 5. May 23–29th: Rome, 12. June 18–24th: Port Said, 2.

Diphtheria, Scarlet-fever, and Measles were particularly prevalent in London, Paris, Marseilles, Vienna, Berlin, Buda Pesth, Prague, St. Petersburg, and Milan at most recent dates.

VITAL STATISTICS OF IMMIGRATION AT THE PORT OF NEW YORK FOR JUNE, 1886.—(1) La Champagne, Havre, 435 passengers, 1 death; Alabama, Glasgow, 562 passengers, 1 death; (3) Olympia, Gibraltar, 580 passengers, 1 birth; (4) Westphalia, Hamburgh, 930 passengers, 1 birth; Baltic, Liverpool, 871 passengers, 1 death; (7) Europia, Glasgow, 875 passengers, 1 birth; (8) Elbe, Bremen, 585 passengers, 1 birth; (10) Pennsylvania, Glasgow, 552 passengers, 1 birth; (12) Richmond, Liverpool, 1045 passengers, 1 birth; (14) Gergovi, Marseilles, 339 passengers, 2 deaths; (17) St. Laurent, Havre, 239 passengers, 1 birth; (20) Chester, Liverpool, 579 passengers, 1 death; (23) Wyoming, Liverpool, 253 passengers;

(25) Thingvalley, Copenhagen, 778 passengers, 3 deaths; (27) Umbria, Liverpool, 597 passengers, 2 births; (28) Aller, Bremen, 609 passengers, 1 death; (30) Rhynland, Antwerp, 216 passengers, 1 birth. Total: 10,005 passengers, 10 births, 10 deaths.

ANNUAL REPORTS.

BROOKLYN, N. Y., Department of Health Report for 1885 we have before reviewed (Vol. XVI., p. 268) for eleven months, ending November 30th, but without the summary for the year, which is now presented. Total number of deaths for the year, 15,369, which number, on an estimated population of 664,602, gives an annual rate per 1000 of 22.09. But this estimate of population, the commissioner (Raymond) remarks, "is, without doubt, below the figure that should be used when studying the question of healthfulness. . . . The estimate of population which most nearly accords with the recent rapid growth of the city is 725,000;" by which the death rate for the year was 21.2; 4125, or 26.8 per cent of the mortality was caused by zymotic diseases; 1965, or 12.8 per cent, was caused by consumption. Some interesting statistics are given of *typhoid-fever* and *diphtheria*, by which it appears the number of deaths from typhoid-fever, 153, was larger than it has been for any year since 1866, when there were 207 deaths from this cause, and during the same year 517 from cholera. In 1865 there were 250 deaths from typhoid-fever, the largest number for any year on record. There were 107 in 1884; excepting this, the largest number of deaths by typhoid-fever in one year, from 1876 to 1883, was 99. The mortality from diphtheria in 1885, 519, was considerably in excess of either of the two years last preceding, when it was respectively 385 and 409, but much less than it was for any year from 1875 to 1882, and particularly for the years 1880–81, when the mortality from this cause was respectively 1118 and 1169. But the two diseases, typhoid-fever and diphtheria, do not seem to hold any relation to one another. For example, in 1880, when there were 1118 deaths from diphtheria, there were only 75 from typhoid-fever; in 1866 there were 77 from diphtheria, and from typhoid-fever 207. Of the special prevalence of typhoid-fever last year the commissioner reports:

"Investigation thus far made by the department points to

two special influences at work in the propagation of the disease: first, defective plumbing; second, inadequate disinfection of the discharges of the patients."

House-to-house plumbing inspection in the districts specially affected, and defects corrected as speedily as possible, and the use of disinfectants, were urged upon the people. But the disease continued until late autumn.

With regard to the condition of the sewers, the commissioner accepts the report of the Superintendent of Sewers, "that the sewers are clean and well ventilated," in the face of facts which we have before taken occasion to publish (Vol. XVI., pp. 157–159) of the deficient ventilation, while he adds: "The Department of City Works is daily flushing and cleaning the sewers, and has been requested to place perforated covers over all man-holes where there are now solid covers. Thousands of these have already been changed, and the work will be continued as fast as possible."

Supplementary reports in relation to the Food Supply, by Dr. E. H. Bartley, Chief Chemist of the Department; on the Ridgewood Water and Methods of Milk Analysis and Experiments on Burning Sulphur in Closed Rooms, by Drs. Walter H. Kent and Otto Grothe; on Milk and Its Adulterations, by Dr. W. A. De Long, Inspector of Milk; on Diseases of Domestic Animals that Affect the Public Health, by L. McLean, Veterinary Inspector; and many brief reports of special investigations, analytical reports on canned foods, coloring matters used in food preparations, candy poisons, arsenic in wall-papers, poisons sold as "Rough on Rats," etc.; and copies of circulars, ordinances, and laws addressed to physicians and the public, illustrate the completeness of the organization of the Health Department of Brooklyn, the thoroughness with which it is administered, and the fruitfulness in results, the relatively small ratio of deaths from preventable diseases, and a diminishing mortality with a rapidly-increasing population.

CINCINNATI, O., Health Department report, C. W. Rowland, Health Officer, for the year 1885, is a pamphlet of 129 pages, chiefly filled up with an excerpt of the laws and ordinances governing the department. The total mortality for the year from all causes was 5973. Death rate, on an estimated population of 325,000, was 18.37 per 1000. The population

of Cincinnati, by census of 1880, was 255,139. The estimated increase to 325,000 in five years indicates a rate of increase nearly three times greater than that which took place during the preceding decade — the census of 1870 being 216,239. But there are other doubtful figures. According to a table giving the principal causes of death for the year, 1120, or 18.7 per cent of the deaths were caused by zymotic diseases. The registrar, on another page, gives 1182 as the number, and 19.78 as the ratio from zymotic diseases. Again: In the table the enumeration of diarrhœal diseases sums up 1120, and typhoid-fever 116; the registrar's report is 639 and 122 of the same, respectively. These and several other irreconcilable differences are quite sufficient to vitiate the statistics throughout and render them of doubtful value. The registration of marriages and deaths are confessedly incomplete. Under this head the Health Officer remarks:

"Persistent effort has been made to secure full returns of these, but our success has not been complete. The penalty for failure of clergymen and magistrates to make returns of marriages, and of physicians and midwives to return births, is the same faulty and insufficient one as that applying to contagious-disease returns. . . . With proper penalties for non-compliance, the returns of births and marriages can be rendered as complete as those of deaths now are, and they are believed to be absolutely full and correct. So long as these defects exist our record of vital statistics will be unsatisfactory and incomplete."

And with regard to contagious diseases:

"The legal penalty for refusal or failure to report is now to be reached only through the absurd and anomalous process of *a civil suit before the Police Court for damages in the sum of fifty dollars!* It should be made a *criminal offence*, with adequate penalties attached. The amended rules of the Board forbidding the hauling of the body of any person having died of contagious disease *in any vehicle other than a hearse*, and the carrying of any such body into any church or hall, will prove beneficial. The rule concerning the attendance of children affected with any contagious disease upon day and Sunday-schools has been made more specific, and will doubtless save many innocent children from dangerous infection."

There is evidently much room for improvement in the health

service of Cincinnati in several respects, the most important of which, on the evidence of the report before us, is sanitary knowledge.

DISTRICT OF COLUMBIA.—Smith Townshend, M.D., Health Officer, reports for the year ending June 30th, 1885: The population is estimated at 200,000: 130,000 white; 69,300 colored. Deaths, 4498: 2610 white, 2588 colored. Annual death rates per 1000: White, 19.97; colored, 34.45; aggregate, 24.99; 1165, or 23.31 per cent of the total mortality, was caused by zymotic diseases. The death rate of the whites from this class was 5.03 per 1000; colored, 7.32. The chief causes, in their order of frequency, were: Diarrhœal diseases, 399: 206 white, 193 colored. Scarlet-fever killed 137; typhoid-fever, 124; diphtheria and croup, 119; malarial-fevers, 78; whooping-cough, 70. Consumption killed 788, or 15.77 per cent of the total number from all causes—14.44 per cent of the whites, and 15.88 per cent of the colored. 86 per cent were under five years of age.

The report is for the most part statistical, comprehending 23 elaborate maps and diagrams showing the social conditions of the population in their relation to disease and the health service, the relations of topography and domicile, and the distribution of sanitary work in its various aspects.

MANSFIELD, O.—With a view to setting forth all the advantages which Mansfield possesses as a place of residence and manufacture, Secretary Ridgway, of the Board of Trade, by direction of the Board, requested Dr. R. Harvey Reed to prepare some statistics bearing on the death rate, in such a manner as would allow comparison with other cities. The report is as follows:

MANSFIELD, O., June 16, 1886.

Secretary Ridgway:

DEAR SIR: I have the honor to submit to you the following report of the vital statistics of Mansfield, which not only includes the deaths from all causes and of all ages occurring in the city, but those who have died in the vicinity and have been interred in the city cemetery, which will average about ten per cent of all the interments after all deductions are made for those who have died in the city who have been buried elsewhere.

1883—Total number of deaths from all causes..... 159
Estimating a city population of 11,000, this makes an annual death rate per 1000 of.....$14\frac{5}{11}$
1884—Total deaths..... 223
Estimating city at 12,000, this gives a rate per 1000 of.....$18\frac{7}{12}$
1885—Total deaths..... 182
Estimating city at 13,000, this gives a rate per 1000 of..... 14

In January, 1883, an epidemic of diphtheria broke out which reached its height in 1884 and gradually subsided in 1885. This increased the death rate in 1883 somewhat over the average, and very greatly increased it in 1884. It was increased also on the same per cent in 1885, and yet the average for the three years is only $15\frac{3}{4}$ per 1000, notwithstanding the fact that 96 deaths occurred from diphtheria during that time, and no deduction has been made for deaths charged up against the city which occurred in the adjoining country round about, which will still decrease the death rate to a trifle over 13 per 1000, allowing only ten per cent for these foreign deaths, which, as the record is now kept, are charged up against the death rate of Mansfield.

R. HARVEY REED, M.D.

NEW HAVEN, CONN., Board of Health.—C. A. Lindsley, M.D., Health Officer, reports for the year 1885, total number of deaths from all causes, 1395. Estimating the population at 80,000, the death rate was 17.4 per 1000; 306, or 22 per cent, were caused by zymotic diseases. A multitude of privies, cesspools, and other recesses for filth storage, and imperfect plumbing fixtures, stand in the relation of cause and effect with zymotic diseases throughout the city—wherever the former obtain in the greatest degree the latter follow in corresponding ratio. These relations are prominently noticeable in the ratios of sickness and mortality from filth diseases in the different wards of the city. Considerable progress has been made, however, in abating these conditions, based upon the exposure of pretty thorough inspection service during the year, with increased hope for continued progress in the future.

The Health Officer concludes his report with the following

cogent statement, which is worthy of publication on the house-tops, that

"The laws of hygiene are not made by man; their operations cannot be arrested by injunctions issued by courts, and their execution is not dependent upon the verdicts of chosen juries or elected judges; but man is subject to them, and for violation of them he will pay the penalty with unwavering constancy."

PATERSON, N. J., Board of Health Report for the fiscal year ending March 20th, 1886.—William K. Newton, M.D., Health Inspector, reports: Population by State census, 1885, 63,287; dwellings, 8687; families, 13,107; persons to each dwelling, 7.28. Deaths during the year, 1195; death rate per 1000 of population, 18.89. Infectious diseases and deaths therefrom: Scarlet-fever, 108 cases, 1 death; diphtheria, 88 cases, 14 deaths; typhoid-fever, 19 cases, 17 deaths. "The apparently high rate of mortality from typhoid-fever" the inspector accounts for by attributing it to the "hybrid disease known as typho-malarial-fever, or to remittent-fever;" but these diseases are generally less fatal than distinctive typhoid. The apparently high rate, therefore, seems to us to be more suggestive of a much larger number of cases and neglect of physicians to report them so long as they showed no fatal symptoms. This is the more probable on account of the soil-polluting filth storage which has so long obtained in Paterson, and which still constitutes one of the chief nuisances with which the Board of Health has to contend, notwithstanding the progress made during the last year in getting rid of cesspools and privy-vaults by compelling all premises abutting on streets in which a public sewer is laid to connect therewith. But no Board of Health whose reports have come to our table has, during the period of three years only, since this one has been organized on its present basis, secured more cogent ordinances for thoroughly efficient work, shown a clearer appreciation of their best intent, or executed them with more directness of purpose for the attainment of the best practical results, than the Board of Health of Paterson, N. J.

READING, PA.—Report of the Board of Health for the year 1885.—M. A. Rhoads, M.D., President, states that "the

greatest need of the city at the present time is a dumping-ground for human excrement now stored in thousands of privies improperly located and carelessly constructed. The city is honeycombed with privies whose contents saturate not only the ground surrounding them, but the materials of which they are built as well. A careful study of our death rates, ward by ward, is significant, and suggests a part of what the city is paying as a sort of indirect tax for sanitary delays. Nature lays a heavy annual tax on filth of all sorts, and she collects it, too." This admonition to the city authorities is followed by a catalogue of work performed, filling half a dozen pages; and next, the record of marriages, 654; births, 1451; and deaths, 1025. Estimated population, 50,500; ratio of deaths per 1000, 20.2. Of the total mortality 412 were of children under five years of age; 364, or 35.5 per cent, were caused by zymotic diseases. "A percentage of mortality from zymotic diseases as great as that," the report truly remarks, "is not very creditable to the sanitary condition of a city endowed with so many natural advantages."

RICHMOND, VA., Board of Health.—J. G. Cabell, M.D., President, reports for 1885: Population, 75,000—42,000 white; 33,000 colored. *Births* registered, 1958—1061 white; 897 colored. *Marriages*, 585—350 white; 235 colored. *Deaths*, 1843—870 white; 973 colored. Death rate per 1000 of total, 24.57—white, 20.71; colored, 29.48. Of the total number of deaths from all causes, 303—190 white; 113 colored—or 16.4 per cent (21.8 white; 11.6 colored)—were caused by zymotic diseases; 269—102 white; 167 colored—or 14.6 per cent (11.7 white, 17.4 colored)—were caused by consumption. Of the deaths from zymotic diseases, there were from typhoid-fever, 33 white, 18 colored; diphtheria and croup, 18 white, 7 colored; diarrhœal diseases, 100 white, 54 colored. It thus appears that the excess of mortality from zymotic diseases was among the white population; of consumption, among the colored. Of infant mortality under five years of age, total, 689—white, 296; colored, 393.

The year appears to have been one of exceptional healthfulness, due, doubtless, in no small degree to the increased public interest in municipal cleanliness and consequent increased support of the health service.

LITERARY NOTICES.

DISEASES OF DIGESTION, URINARY AND GENERATIVE ORGANS. Illustrated by 106 fine wood engravings. By Dr. HERMANN EICHHORST, Professor of Special Pathology and Therapeutics and Director of the University Medical Clinic in Zurich. Vol. VI. of Wood's Library for 1886. New York: William Wood & Co.

This is Vol. II. (of the four volumes) of the "Handbook of Practical Medicine." It comprehends in an extraordinary degree those diseases with which every physician engaged in general practice most frequently meets, and on that account is most in need of a thoroughly practical handbook of this kind, which contains the essence of encyclopædic knowledge. The illustrations of the microscopic appearances of urinary deposits and of animal parasites of the intestines are particularly excellent.

PHYSICAL TRAINING IN AMERICAN COLLEGES AND UNIVERSITIES. By EDWARD MUSSEY HARTWELL, Ph.D., M.D., of Johns Hopkins University. Circular of Information of the Bureau of Education. No. 5. 1885. A pamphlet of 183 pages of much interest, historical and practical, on a subject deservedly attracting the attention of all educationists.

THE GENUINE WORKS OF HIPPOCRATES. Translated from the Greek, with a Preliminary Discourse and Annotations. By FRANCIS ADAMS, LL.D., Surgeon. Vol. II. Vol. VII. of Wood's Library for 1886. New York: William Wood & Co.

Of this work, we have already taken occasion to remark on receipt of Vol. I., every medical practitioner knows the value, "as the classical foundation-stone of scientific medicine." But there is reason to fear that while all practitioners cherish the name of the "Father of Medicine," the number who have actually made themselves familiar with his pristine works is relatively few. All such will be no less agreeably surprised than edified to find how little there is of what he taught to be

unlearned. Moreover, they will be edified with the excellent wood cuts in these volumes of the surgical armimentarium of Hippocrates, adapted to more knowledge of practical surgery than we can very well conceive it possible for one not (?) acquainted with anatomy. The work is the more valuable for the annotations and analysis of the translator, by which the reader is made familiar with the criticisms of Hippocrates by other writers.

THE THIRD ANNUAL REPORT OF THE BUREAU OF STATISTICS OF LABOR OF THE STATE OF NEW YORK, for the year 1885, Charles F. Peck, Commissioner, is a volume of 653 pages and seven full-page illustrations, with numerous tables germane to the text, giving a large amount of information of importance to every citizen of the State.

The requirements of the law establishing the Bureau are: "To collect, assort, systematize, and present in annual reports to the Legislature, within ten days after the convening thereof in each year, statistical detail relating to all departments of labor in the State, especially in relation to the commercial, industrial, social, and sanitary condition of workingmen, and to the productive industries of the State."

To literally fulfil these requirements, the commissioner very justly remarks, "would necessitate a clerical force larger than that employed in the different departments of our State government, and an appropriation quite an hundredfold greater than that ever placed at the disposal of the Bureau." Hence he follows "the policy adopted by the Bureau, at its inauguration in 1883, of making an investigation of one or more special subjects within the scope of its legal inquiry yearly," and confines his investigations for the past year to "Workingwomen, their Wages and Home Conditions;" "Strikes, and their Results," and the "Condition of Conductors and Drivers of Street Railways," than which surely it would be difficult to select more timely subjects.

With regard to the first of these subjects, ninety-one different trades are enumerated, and a detail of nearly two hundred kinds of work tabulated, enumerating number of employés in each, with and without machinery, and the wages per week. There are also special tables of the leading employments, such

as cigar and cigarette-making, tailoring, shirt-making, millinery, dress-making, saleswomen, etc., giving occupation to great numbers, and following these statistics a description of the conditions under which the several avocations are pursued. Under the head of "Sanitary Conditions" the commissioner states:

"The Bureau sent out many thousand blanks to employés of factories. But comparatively few were returned, and many of those were not fully filled out. However, from the eight hundred and odd received enough testimony has been elicited to establish the fact that the sanitary condition of a large number of these workshops is absolutely bad." In addition, he goes on to remark upon deficiencies of means of protection from fire and other dangers, and the almost utter lack of proper facilities for the change of dress and separate water-closets. In short, there appears to be not only an utter lack of decency on the part of the employers of this large and dependent class of operatives, but equally of humanity. Their employés are reduced to a degree of distress, poverty, and degradation so low as to leave no middle ground for them between silent submission and the poor-house—a single word of complaint is to cross the Rubicon.

It is manifest that the authority and means at the disposal of the commissioner are insufficient to even expose the *abject slavery of probably not less than one hundred thousand women in the State of New York to-day* worse than was ever imposed upon the African race, which has been held up by some of these self-same factory lords as the sum of all villainies. They should no longer be left to answer for themselves, or their employés be asked to answer—at the imminent risk of the poor-house. No blanks filled out by either of the parties involved in these conditions are trustworthy. Investigation should be made by legally authorized competent inspectors; nothing short of this can fully expose the extent to which slavery of the most disgraceful kind is, and has been for many years, practised in the State of New York.

The other subjects of special inquiry in this volume have been so fully discussed by the newspapers for several months past as to render a review from our standpoint unnecessary, further than to remark that it has greatly added to the burdens

of the *workingwomen*, who are well-nigh crushed to the earth by the force of the blow, while the voice of the press is still ringing the changes of "conductors," "drivers," and other "strikers," as if upon them and their like the whole well-being of human society depends.

HATTERS' CONSUMPTION is the title of an instructive pamphlet, the reprint of a contribution to the New York *Medical Journal*, by J. W. STICKLER, M.S., M.D., of Orange, N. J. Statistics are adduced to show that pulmonary phthisis is the most common and fatal disease among hatters; and, on the evidence of some manufacturers, the majority of hatters die of it. The greatest number of deaths from consumption occurs among the finishers—82.3 per cent, and it is supposed to be due to the mechanical irritation of the lungs by the fur and dust which pervade the air of the "finishing" and "pouncing" rooms. The workers in ostrich feathers are also said to be particularly liable to consumption from the same cause. The author suggests the removal of the exciting cause as the only remedy. Whether this is practicable, consistent with the necessary processes of manufacture, is questionable.

The remedy for this, as well as for other dusty trades, is palpable: Every operative should filter the air he breathes by wearing a respirator. A very simple one may be found described in a lecture on the "Prevention of Artisans' Diseases," by Dr. E. D. Mapother, of Dublin, about a dozen years ago. It consists of a wire gauze so shaped as to cover the mouth and nose, lined with a thin layer of cotton wool, and is held in place by a peg projecting from the inside, held between the teeth, or by a string from each side looped over the head.

THE CENTURY DICTIONARY.—The Century Co. is engaged in preparing a dictionary of the English language, of which Professor William D. Whitney, of Yale College, is editor-in-chief, the purpose being to make a more comprehensive work than has yet appeared in popular form, to include, in addition to a very full collection of individual words in all departments of the language, all technical phrases, not self-explaining, in law, the mechanical arts, the sciences, etc. Indeed, it is designed to make this dictionary so complete in its definitions

of all branches of science and art that even the specialist will need nothing further. The number of "new" words in many of these departments is said to be surprisingly great. The dictionary will have also a remarkably complete system of cross-references, and will embody in itself a dictionary of synonyms which will add greatly to its value.

A prominent feature of the new work will be its encyclopædic character. Its definitions will be fuller and more complete than is customary in works of this kind; it will go further into the various uses and meanings of words, and in many cases will give full explanations and descriptions of matters historical, scientific, legal, mechanical, etc.

The publishers are taking great pains with the illustrations, of which there will be about five thousand, employing the same class of artists and engravers that contribute to their magazines, and they mean to make the result something hitherto unknown in the world of dictionaries. Two or three years must still elapse before it will appear, and in the mean time opportunity is offered by the publishers to those interested in helping on so useful a work to contribute material and suggestions to it. Much valuable matter has been received in this way from many scholars and practical men all over the world.

It is estimated that upward of a quarter of a million of dollars will be spent upon The Century Dictionary before it is ready for publication. The work of type-setting and printing will be done by the De Vinne Press, in the new building into which they have recently moved.

THE NEW YORK MEDICAL MONTHLY is a new periodical, sixteen pages, quarto, edited by J. Leonard Corning, M.D., with a list of contributors significant of good auspices. The first number (May) contains contributions by Drs. Fessenden N. Otis, George Henry Fox, C. R. Agnew. $1.00 *per annum. New York Medical Monthly*, 108 Duane Street, New York.

EDUCATION IN JAPAN, No. 4, 1885, of "Circulars of Information" of the Bureau of Education, is a pamphlet of fifty pages, of interest to all persons who would be well informed on the organization and statistics of education in that country.

THE SANITARIAN.

SEPTEMBER, 1886.

NUMBER 202.

STATE MEDICINE.

Abstract of an Address before the American Medical Association, St. Louis, May 6th, 1886, by JOHN H. RAUCH, M.D., Chairman of the Section on State Medicine.

THE application of the term State Medicine is now seen to have been successively extended from the agency of the State in matters of hygiene beyond the control of the individual, first to measures of preventive medicine in general, and thence to curative medicine in so far as it is the duty of the State to regulate medical practice. State Medicine may therefore be now defined as the connection of the State with "*that branch of science which relates to the* PREVENTION, CURE, *or* ALLEVIATION *of the diseases of the human body.*" * It embraces not only all public sanitary measures, but also the practice of medicine in so far as this is regulated by the State. Therefore, any report upon "the advances and discoveries of the past year" in the branches included in this section may logically begin with the subject of the regulation of medical practice, which also and necessarily includes the subject of medical education.

Speaking specifically of the Illinois Medical Practice Act, ex-Governor John M. Hamilton has recently said: "The object of the Medical Practice Act was primarily a police regulation. Incidentally it was educational. Primarily the purpose of the law was to rid the State of incompetent, ignorant, and dangerous mountebanks and quacks, who were carrying on a fraudulent and nefarious business by all manner of deceit

* The quotation is the definition of *medicine* according to Webster.

in a pretended practice of medicine among the people. It was to protect the lives, the health, the morals, and the property of the people of the State from the shameless depredations of swindlers and adventurers who, by all manner of false representations and deceptive promises, were taking advantage of the misfortunes of the people in sickness and ailments of all kinds, to still further injure their health, endanger their lives, and rob them of their money.

"Incidentally the law was designed to require a reasonable amount of education to fit one for the practice of medicine before he should be allowed to enter that profession, so directly and intimately connected with the lives, the health, and the happiness of the people. Both these purposes come clearly within the police powers of the State in affording such protection to its citizens."

Since 1765 a total of 224 medical educational institutions have been founded—not established—in this country, of which number 105 are now fortunately extinct. There are still remaining 120 medical schools of all kinds in the United States, and among them, it is only fair to say, are some in which the course of instruction, the facilities, and the competency of the teachers are as high as anywhere in the world. Within the last twenty years there has been, in fact, a marked and gratifying improvement in the standard of medical education. I quote a few illustrations of recent improvement from my last report on "Medical Education in the United States and Canada:" There are now 93 out of the existing 120 colleges in the United States which exact an educational requirement as a condition of matriculation; in the first report there were only 45. Attendance on three or more lecture courses before graduation is now required by 24 colleges, as against 12 heretofore; and provision is made for a three or four years' graded course by 58 others. Hygiene is now taught in 91 colleges, and medical jurisprudence in 97, as against 42 and 61, respectively, heretofore. The average duration of lecture terms has increased from 23.5 weeks to a fraction over 25 weeks; 7 more colleges have lecture terms of 5 months or over, and 10 more have terms of 6 months or over as compared with the sessions of 1882–83.

While much of this progress is due to a general and increas-

ing desire on the part of the profession to raise the standard of attainments necessary to enter its ranks, and to the enforcement of certain requirements in States which have enacted laws regulating the practice of medicine, it will not be invidious to attribute a fair share to the adoption in 1880, by the Illinois Board, of a schedule of minimum requirements, enforced since 1883, and which prescribes that a medical college, in order to be held in good standing for the admission of its graduates to practise in Illinois, shall exact such a general preliminary education of the intending student before his admission to the lecture-room as will enable them to comprehend the instruction therein given ; and shall issue its diploma conferring the degree of M.D. only upon the completion of such curriculum of study—as to the branches of medical science taught, the duration of the reading, and of lecture terms, and the amount of practical instruction in hospital and at the bedside—as obtains in the average medical school.

Minnesota, Missouri, and West Virginia exact substantially the same standard, and the work of the Minnesota Board especially has been wide-reaching and beneficial in this respect. The Iowa law, just enacted, confers similar powers, and the influence upon medical education of this group of States—Minnesota, Missouri, Iowa, and Illinois—in establishing a uniform test of the "good standing" of a medical college, must be felt throughout the country. Fully one third of the new graduates every year settle in the West, and colleges must, perforce, take cognizance of this fact.

While the schedule of minimum requirements does not set up so high a standard as that aimed at by the American Medical College Association, it has the advantage of applying to all schools of medicine and of having been successfully enforced for three years. Furthermore, it is susceptible of modification, and the question is already being considered whether the time is ripe for a further advance. Until within a short time there had been, for sixty years, no marked departure from the orthodox three years of study and two courses of lectures as the requirements for graduation. But, as already shown, there are now twenty-four colleges which practically require four years of study and attendance upon three terms of lectures ; and fifty-eight others which make

provision for a similar extended course. The domain of medicine has so far widened its borders, especially within the present generation, that the methods and periods of study which sufficed thirty or forty years ago are no longer adequate.

A low standard of medical education, and the absence of uniform legal requirements are also responsible, almost exclusively, for the overcrowding of the profession. Did time suffice it would be interesting to present this matter in detail, but I can now only glance at some of the results of my study of this phase. In 1880 there were, according to the national census, 83,436 physicians in the United States. Since that date there have been added—exclusive of the foreign increment—23,531 new graduates, not including those of the last session, 1885–86. This makes a total of 106,947, and is an annual increase of over five and one half per cent, while the annual increase of population is less than two per cent.

The foregoing considerations seem to me to lead logically to the following conclusions:

1. That the best interests of the public welfare demand the highest attainable standard of educational qualifications, skill, and ability, as well as of professional and personal honor, integrity, and morality, among those engaged in the practice of medicine.

2. That it is the duty of the State to exercise the inherent plenary power and authority which it possesses for the protection and promotion of the public welfare, to secure such standard.

3. That uniform State laws, exacting of every one aspiring to practise medicine proof of personal fitness and professional competency, would prove the most potent agency in improving the standard of medical education and in enhancing the dignity and usefulness of the medical profession.

While there has been this marked and gratifying improvement in the branches thus far considered—now clearly recognized as belonging to the domain of State Medicine—the past year has witnessed equally satisfactory practical advances in the more familiar province of Preventive Medicine. The number of sanitary organizations, both legal and voluntary, has increased; the contributions to sanitary literature have been numerous and valuable; and professional and public

interest and effort have been enlisted as never before in attempts to remove or abate the preventable causes of disease, and to discover and perfect safeguards against the great pestilences. To a great extent this has been stimulated by the prevalence of Asiatic cholera in some parts of Southern and Western Europe, and the consequent dread of its extension to our shores. Fortunately, the apprehensions entertained at the date of the last meeting of the Association have not been realized, and the country has been practically free from any general or noteworthy epidemic, notwithstanding the prevalence of small-pox in some parts of Canada.

State and Municipal Boards of Health have generally done effective work in their respective spheres. In some States a general sanitary survey has been undertaken, and in many cities, towns, and villages house-to-house inspections have been pushed, and the nuisances and defects thus disclosed, both of a public and private nature, have been largely remedied. As was frequently remarked during the past summer and fall, an amount of general and local "cleaning up"—which is the essence of sanitation—was accomplished, which could not fail to have an appreciative effect upon the public health. Unfortunately, the subject of the registration of vital statistics is in such an imperfect and unsatisfactory condition in this country that it is not possible to give any comparative figures by which to measure this gain for the whole country; but the mortality returns of the large cities generally show a reduction in the death rate of 1885 as compared with the average death rate for several years previous.

Four more State Boards of Health were established in 1885–86, the list now comprising the following thirty-one organizations, the dates of the establishment of which are prefixed: In 1869, Massachusetts; in 1870, California; in 1872, Minnesota; in 1873, Alabama, Michigan, Wisconsin; in 1874, Maryland; in 1876, Colorado, Louisiana, New Jersey; in 1877, Illinois, Mississippi, Rhode Island, Tennessee; in 1878, Connecticut, Kentucky, North Carolina; in 1879, Delaware, Iowa, South Carolina; in 1880, New York, West Virginia; in 1881, Arkansas, Indiana, New Hampshire; in 1883, Missouri; in 1885, Dakota, Kansas, Maine, Pennsylvania; and in 1886, Ohio.

These Boards, it is proper to remark, owe their existence largely to the influence of the American Medical Association, which has for years actively promoted their organization.

While States and municipalities are thus generally exerting themselves for an efficient protection of the public health, our national health service remains in a very unsatisfactory condition. Notwithstanding the efforts of the profession generally and of many health organizations to secure action by Congress for the remedy of this condition of affairs, nothing definite has yet been done. Three different bills have been introduced during the present session, but there is little hope of either of them receiving favorable consideration.

One thing remains clear: Whether by the rehabilitation of the National Board or by the creation of a new organization, it is the imperative duty of Congress to complete the health defences of the country. Municipalities have their legitimate sphere within which they alone can act and are responsible, and next beyond which the authority and resources of the State are demanded. But neither municipalities nor States can protect themselves against foreign pestilences without the assistance of the national authority, nor can they properly guard themselves against inter-State infection or contagion without the co-operation of the same authority. I have already dealt with this subject fully in an address before the National Conference of State Boards of Health in 1884, on the "Prevention of the Introduction of Asiatic Cholera," in a report made in the early part of the present year on our "Coast Defences against Asiatic Cholera," and elsewhere.

Among the voluntary organizations the work of the American Public Health Association during the year has been of more than usual practical value. The Lomb Prize Essays, and especially the "Report on Disinfectants and Disinfection," are substantial additions to sanitary knowledge. The Sanitary Council of the Mississippi Valley has not been called upon for action, but its organization is preserved ready for an emergency. Nothing definite was accomplished at the last National Conference of State Boards of Health, which was held during the Washington meeting of the Association.

Abroad, a second series of sessions of the German Cholera Conference was held in Berlin May 5–7th, 1885, at which the

subjects of the etiology and prevention of cholera were discussed by Koch, Pettenkofer, Virchow, Hirsch, and others, but without eliciting much which was new, or settling any of the mooted questions. Professor Koch summarized the chief measures to be taken against the disease, and which, so far as they go, do not differ from those adopted by good sanitary authority in this country. They dealt, however, exclusively with the local safeguards of sanitation, disinfection, isolation, supervision, etc., and ignored measures of exclusion of the disease by notification, maritime sanitation, supervision of ports of embarkation, and quarantines of inspection, observation, and sanitary work at ports of arrival.

Following the adjournment of the Berlin Conference, an International Sanitary Conference was held at Rome under the auspices of the Italian Government. Although its paramount object was the discussion of questions relating to the prevention of cholera, the subject of yellow-fever was also considered in the same relation, through the efforts of the American delegate, Dr. George M. Sternberg. The delegates were of two classes, diplomatic and technical or professional, and at an early stage a Technical Commission was formed, which finally agreed upon substantially the same measures that advanced sanitarians in this country considered necessary for the limitation and suppression of cholera, yellow-fever, and other communicable diseases which, under bad sanitary conditions of vessels and places, may become epidemic. The exceptions to such agreement were the English delegates, composed of gentlemen whose experience with cholera had been mainly limited to India, and who, in consequence, deny the communicability of the disease through human intercourse, deny the infectiousness of cholera dejecta, and pronounce disinfection a farce and unscientific.

The Conference adjourned to meet again in the fall, but this intention was not carried out. As I have heretofore observed, the practical benefit to be derived from these conferences—in the absence of authority to make an international sanitary convention, binding upon all interested—is the interchange of views, the dissemination of knowledge, and the formulation of such views and knowledge. So far as this country is concerned, they have not changed the status in any

respect. We must continue to rely, for the exclusion of cholera and other Old-World pestilences, upon such precautionary measures as can be secured at ports of arrival.

The International Congress of Hygiene, which has been held successively at Brussels, Paris, Turin, Geneva, and the Hague every alternate year for the past ten years, and which should have been held this year at Vienna, has been postponed until 1887, for some reason not yet announced.

With the object of determining to what extent such precautionary measures may be secured, especially against Asiatic cholera, I have made an inspection of the quarantine maintained upon the Atlantic and Gulf coasts from the St. Lawrence to the Rio Grande. The results of this inspection have been published by the Illinois State Board of Health, and as the report is accessible to the members I will confine myself on this occasion to the following conclusions: I am more than ever convinced, since completing this inspection, that Asiatic cholera, as well as small-pox and yellow-fever, may be effectually excluded from the United States by an intelligent use of the agencies still at our command. This is not a matter of speculation or theory. A great advance has been made in practical sanitary science since 1878—notably in the administration of the maritime quarantines generally, and especially in the improved safeguards at the mouths of the St. Lawrence and the Mississippi. A quarantine of exclusion of the three principal epidemic diseases is now a matter of certainty, depending upon prompt notification of threatened danger; vigilant supervision over commercial intercourse with infected localities; inspection of all immigrants and the enforcement of their vaccinal protection; sanitation and purification of infected vessels and cargoes; isolation of those sick with these diseases; the surveillance of suspects during the periods of incubation; and the employment of other well-defined preventive and precautionary measures which now constitute the best modern sanitary practice as applied to maritime quarantine.

It must be repeated, however, that the co-operation of the National Government with State and local authorities, as well as its independent action in matters beyond the reach of States and municipalities, are indispensable to the proper protection of the public health. The duty of Congress in this connection is even more pressing than the responsibility of providing

defence against an armed enemy. This latter is a more or less remote contingency, but the assaults of foreign pestilence are constant and continuous.

Thus far we have been providentially spared an invasion of the Asiatic plague which is now filling Great Britain and Europe with anxiety, and the real extent and prevalence of which we do not know. The State Department has, within a few days, been requested to appoint sanitary inspectors at the United States consulates at Genoa, Naples, Marseilles, and Venice, with instructions—in the language of the despatch—"to give prompt information of the appearance of cholera in any of the consular districts named, and to report the departure of emigrants and merchandise for the United States from infected districts." But it is already known that the disease exists, and has for months, in several provinces of Italy, including Venetia—cases having been reported in Venice even in January last; it is known that the entire Mediterranean littoral is practically an "infected district," and that the northward march of the pestilence is causing alarm in Austria, Germany, Northern Europe generally, and in Great Britain. The appointment of sanitary inspectors at one French and three Italian ports hardly seems adequate to the occasion. At no time since cholera was announced at Toulon in 1883 has this continent been in as serious danger of an invasion of the disease as it is now. And not alone does cholera threaten, but small-pox is epidemic in many districts with which we are in direct and frequent communication. It is worthy of passing note that cholera has invaded a new continent within the past few months. Its introduction into Australia, where it had been hitherto unknown, furnishes a fresh proof, if any were necessary, of the transportability of the contagion, of the necessity of supervision over maritime travel and commerce, and of the importance of being prepared to meet and properly deal with an infected vessel upon its arrival.

I cannot close the consideration of this branch of my subject without a brief reference to the obvious necessity of national control of immigration. Sanitary science and public hygiene touch both the individual and the national life at many points. It is a question which is daily and hourly becoming more urgent—as the columns of every issue of every newspaper show—how much longer it will be safe or prudent to continue

the unrestricted influx of the vicious, the insane, the pauper, and the infected immigrant into our midst. Neither the sanitarian nor the statesman can afford to longer ignore its consideration.

The By-Law calls for a report on the "advances and discoveries of the past year in the branches of science included" in the section. While the workers have been active and their labors faithful in many directions, it is to be feared that the discoveries in preventive medicine are too intangible or too incomplete to warrant much of positive statement. There are new theories and claimed discoveries concerning malaria, cholera, yellow-fever, hydrophobia, tuberculosis, and other diseases. But whether Klebs and Crudeli or Marchiafava or Celli have found the malaria germ; whether Koch and his followers or Klein and his *confrères* are correct as to the causative connection of the comma bacillus with Asiatic cholera; whether Domingo Freire and Carmona are to share the obloquy of Ferran or the honors of Pasteur; whether bacteria themselves, or only their products, or whether neither one nor the other, but ptomaines and leucomaines produced by normal vital action are the morbific agents of disease against which the sanitarian must direct his energies—these and similar questions are yet *sub judice.*

The etiology of such common diseases as diarrhœa and diphtheria are still equally obscure, although some light seems to be thrown upon the origin of certain outbreaks of the latter disease by the observations of Dr. Cresswell, who, in a paper recently read before the London Epidemiological Society, thinks he has traced six outbreaks of diphtheria, for which there was no other obvious explanation, to persons suffering from chronic tonsillar inflammation following attacks of diphtheria, and concerning whom he asks: "Do the violent reactions of the tonsils of these persons to weather changes involve likelihood of rendering them diphtheritically infectious?" In other words, may diphtheria become chronic and liable to periods of infective recrudescence? The question acquires additional importance for the medical officer of health from the fact that the disease is unmistakably increasing in frequency and in its influence upon the death rate.

On the other hand, bacteriology may fairly claim to have

advanced the science of water analysis, which no longer depends upon chemical and microscopic examination, but for the purposes of the sanitarian must be submitted to the further test of biologic experiment. It has also certainly been of service in raising the art of disinfection to the level of an exact science, and the labors of Sternberg, Smart, Salmon, and others in the bacteriological field in the United States are not unworthy of comparison with the work in Europe.

A reaction, however, seems to be setting in against the sweeping claims of the bacteriologists, and the assertion, for example, that the typhoid bacillus, after twenty years of experiment, has at last been demonstrated to be the true typhoid germ, will not stand the criticism of Professor von Pettenkofer, who, in a recent address on the relationship between bacteriology and epidemiology, points out that the entire environment of a micro-organism and all the conditions which influence its growth, development, and results must be taken into the account, and that the mere fact of setting up a certain train of symptoms in a lower animal analogous to those observed in the human subject is by no means conclusive proof that the specific fungus transmitted from the one to the other is the sole cause of the disease in the higher organism. In this address, which, like all of his contributions to scientific hygiene, is replete with food for thought, Pettenkofer asks what the study of bacteriology has done in advancing practical sanitary measures, and pertinently cites Lister's antiseptic system and Pasteur's rabic inoculation as instances of practical results accomplished without demonstrating the existence of a special form of bacteria or the actual morbific agent. He might still more strikingly have referred to Jenner's immortal discovery.

Concerning this subject of vaccination I beg to call the attention of the members to the additional proof cited in recent reports of the Illinois Board, of the superiority of humanized virus, not too far removed over bovine, in cases demanding promptness and certainty of action. I think this practical point cannot be too strongly insisted upon, and it may be well to repeat, as a fitting conclusion of this address, my remarks on this subject in the paper on "The Relations of Small-Pox and Vaccination" in the Fifth Annual Report of

the Board (p. 502). Treating of the promptness of action in the face of exposure, it is there shown that humanized virus may be depended on much more certainly than bovine to act promptly. Usually on the second or third, very seldom so late as the fourth day after the insertion of good humanized virus, the papular stage of vaccination will begin, and be followed, with almost unvarying regularity, by complete development of the vesicle on the eighth day, and by the subsequent appearance of the "index of safety"—the specific inflammation of the skin, or stage of areola. Bovine virus, on the contrary, is subject to all degrees of delay, even to periods of weeks. During the epidemic of 1881–83 this defect of bovine virus was more than once followed by serious consequences. Not alone were lives lost among the exposed members of isolated families, where vaccination was resorted to early enough to have averted an attack had the virus acted promptly, but epidemic outbreaks followed under similar circumstances—that is, in localities where, upon the discovery of the first case, vaccination of all unprotected or exposed was at once resorted to, with bovine virus, but which either proved so tardy in its action, or so totally inert, as to allow the disease to gain a foothold.

"The loss of a day," says Seaton in his "Hand-book of Vaccination," "may be the loss of a life." Hence the necessity for using virus which will act promptly, and not remain latent three, five, or any other number of days. Recent experience corroborates observations made during the period from 1866 to 1873, while Sanitary Superintendent of the city of Chicago, to wit: That it is never too late to vaccinate after exposure, short of the actual appearance of the variolous eruption. If the vaccination be performed within three or four days after exposure, and the areolar stage, the index of safety, be reached in the normal time, an attack of small-pox will almost invariably be averted. With every additional day's delay the protective power will be weakened; but, contrary to the opinion laid down in the text-books, experience proves that this protective power is not entirely exhausted until the vaccination is deferred at least up to the beginning of the febrile stage of small-pox.—*From the Journal of the American Medical Association.*

A PROPOSED NEW PLAN OF PUBLIC SANITATION.

By O. W. WIGHT, Health Officer of Detroit, Mich.

THERE is a material difference between sanitary teaching and sanitary administration. Sanitary teaching, by means of lectures, conventions, reports, articles in the press, and books, must necessarily precede the execution of sanitary law. Such teaching is a good in itself, as sanitary knowledge is always valuable, but it is a still greater good as a basis for the enforcement of sanitary statutes and ordinances.

The Michigan State Board of Health is entitled to great praise for its work of systematic and effective sanitary teaching. As preparing the way for the higher work of sanitary administration it is commended of all men. The Board has been, and still is, wise in its generation by not undertaking to execute measures in advance of public sentiment. It has avoided the rock on which the State Board of Health in Massachusetts was wrecked. The very able Massachusetts Board undertook to administer faster than it taught. The Michigan Board has mostly confined itself to teaching, and has hitherto escaped the perils of premature efforts to enforce sanitary law.

In this brief paper I propose to outline a system of State sanitary administration. Neither directly nor indirectly, neither by affirmative statement nor by implication, do I intend to criticise the work of the State Board of Health. The plan proposed may be premature, yet is sure to encounter conservatism enough to keep it from being rashly adopted. Without the powerful co-operation of the medical profession it could not be adopted at all.

Among people with a fair amount of sanitary information you will find a large majority who readily assent to a reasonable proposition that a certain thing should be done to protect or promote the public health. Very few will dispute the

propositions that a foul vault should be cleaned, that a cellar with stagnant water in it should be drained, that a heap of decomposing manure should be removed from the vicinity of a habitation, that well persons should not be wantonly exposed to infectious diseases, that a small-pox funeral should not be held in a church or other public place, that dangerously adulterated goods should not be sold, that school-houses should not be overcrowded, that factories should be ventilated, that the flesh of diseased animals should not be eaten, that water polluted with the sewage of inhabited places should not be used for drinking; yet most people will neglect or refuse, when their ease or interest is involved, to take any action or incur any expense in accomplishing such desirable ends, whatever may be their individual responsibility, unless they are confronted with a specific order from an executive officer armed with a positive law, involving penalties that may be imposed by a court. Good sanitary teaching secures assent to a sanitary proposition. Wise sanitary law, discreetly executed, will alone secure general sanitary action.

Sanitary administration in this country is almost unknown outside of the larger cities. The seasoned municipal health officer necessarily has an experience that entitles his convictions and recommendations to weight. He has something more than theories to advance. He knows what obstacles must be encountered and understands what laws may be successfully executed. He comprehends the immense difference between the passive verbal assent of a sanitary sinner and the fruitful action stimulated by sight of a rod in the hand of justice.

The foundation principle of all sanitary enactments is to prevent each one from doing harm to others. No man has any more right to poison the air that I must breathe, the water that I must drink, the food that I must eat, than he has to steal my purse, wound my body, or take my life. "*Sic utere tuo alienum non lædas,*" so use thine own as not to injure another's, is a sound maxim of the law.

For the sake of clearness, I must make one more preliminary observation. Medical men are, and always have been, excellent sanitary teachers. As a rule, they are not good sanitary administrators. Yet the profession must furnish the material

out of which sanitary administrators are made. In some respects, there is a natural antagonism between curative medicine and preventive medicine. I do not allude to possible conflict of interests. I mean that the constant mental habit of the physician is different from the mental habit of the sanitarian. The former is always thinking of the proper remedies for curing diseases. The latter is always thinking of methods of preventing diseases. Both must have ample knowledge of the diseases which they are in the habit of contemplating from different points of view. Hence the educated medical man has the necessary basis of knowledge for becoming a sanitarian. For such purpose, however, special knowledge must be added, and the proper change of mental habit must be acquired. Hence no man should at the same time practice medicine and sanitary administration. Besides, for obvious reasons, it is not fair to the profession that a fellow-practitioner should simultaneously act as health officer in the same community.

This leads me to advocate a radical change in the sanitary system of this State. The territorial sanitary unit in the State is the township. The population of the average township is so small as to preclude the possibility of employing a health officer exclusively. Many townships designate a local physician as health officer, and compensate him for his services with a salary of ten, fifteen, twenty, twenty-five, or fifty dollars. Some of the medical brethren contrive in these obscure places to do a great deal of good work. Verily they have their reward, but not in this world's goods.

In these small sanitary parishes we find the worst effects of the combined work of the sanitarian and of the physician. It is hardly to be expected that the practising health officer will be very strict with his own patients. If he holds them to rigid sanitary responsibility he will lose their patronage. If he shows them favors, then other physicians will, naturally, charge him with partiality. Consequently, he will lose the co-operation of the medical profession, which is necessary to successful sanitation.

The only remedy is to enlarge the territorial unit of sanitary administration, so that a health officer may be employed who can give his entire time and energy to his official work. The county is the natural subdivision in our system of State

administration. The population is generally enough for a thorough scheme of practical sanitation.

Take a county of 30,000 inhabitants. Taxation for purposes of sanitation should be uniform throughout the State, and should be imposed by statute. A tax equivalent to ten cents per capita, levied by the State, would amount to $3000 in a county with 30,000 inhabitants. Such a tax would be equal to fifty cents for the average family of five persons—the lowest charge by a physician for an office prescription. One half of the aforesaid sum of $3000 would secure the services of an intelligent, well-educated young physician as county health officer. The other half, or $1500, would pay for the services of a clerk, to keep the records of the health office, and also for the services of a good inspector, to work with and under the direction of the health officer. The State should supply uniform blanks and record books. The county should furnish a suitable office at the county seat.

How shall these officers be appointed and what shall be their duties?

A county Board of Health, composed of two doctors and one lawyer, to serve without compensation, should be appointed by the county Board of Supervisors, and such Board of Health should appoint the health officer. And the health officer should appoint his clerk and inspector. The health officer thus appointed, before qualifying and entering upon his duties, should be required to undergo an examination by the State Board of Health, for the purpose of having his fitness for the place fully determined. In addition to his medical knowledge, he should also know the elements of sanitary engineering, of chemistry, and of the law of nuisance. He should be perfectly familiar with the laws which he is to administer. His executive capacity and his character for industry, impartial justice, discretion, and moral courage should by taken into consideration. His tenure of office should be during good behavior, and he should be clothed by law with the necessary powers of independent action. The appointing board should be advisory and not absolutely controlling.

The first duty of the county Health Department, constituted as aforesaid, should be to keep complete records of deaths,

births, and marriages. These records should be separate and carefully indexed. Under stringent law, unflinchingly executed, all deaths, births, and marriages should be reported to the county health office. The reports of deaths should state the causes, names, age, sex, nativity, parentage, place, date, etc. The reports of births should be exact in all details. The reports of marriages should be full and precise. The records should be kept neatly, exactly, and according to an uniform plan. Full transcripts of such records should be transmitted on uniform blanks, every month, to the State Board of Health, under proper penalty. An effectual check on the diligence, promptness, and efficiency of the county sanitary officers would thereby be in the hands of the central authority. Besides, the State would thus be in possession of all the vital statistics of the commonwealth. Such statistics would be reliable and of vast benefit in various ways to the people and their legislators.

In addition to the records of deaths, births, and marriages, the county health officers should also keep a complete record of all cases of contagious diseases in their several jurisdictions. A transcript of this record, at least a summary of it, should also be transmitted weekly to the State Board. The executive officer of the State Board would then know exactly where to direct his efforts and extend his aid in combating epidemics among the people.

The experience of the health departments in Detroit and some other cities of the State demonstrates that such statistics may be obtained and accurately kept and preserved. The desirable end can be reached, under clear and just laws, with the intelligent and willing co-operation of the medical profession. I have no doubt the whole profession would thus co-operate, if the profession itself were properly protected by wise legislation.

We need, the people need, a stringent law, like that of Illinois, to close up the nefarious business of pretenders to medical and surgical knowledge and skill. At the present time Michigan is full of medical vermin, driven by recent enactments out of surrounding States. They infest the body politic and should be speedily subjected to an exterminating application of legal unguentum. As in Illinois, the State

Board of Health should be charged by statute with the duty of administering the remedy and licensing all practitioners. None but the properly qualified and the worthy should be retained. Midwives, which seem to be a necessity for the poor among the people, might be licensed, under stringent rules as to qualification and character, by the county Boards of Health.

The medical profession, thus purified and protected from intruding quacks, might be intrusted in much larger measure with the solemn and responsible duty of isolating persons and families afflicted with infectious diseases. A proper and effective punishment for failure to co-operate with health officers, to secure the safety of the people, would be the revocation of license to practise, and the consequent ignominious relegation to the walks of private life. All licenses to practise should be made conditional upon, and subject to, revocation by the licensing authority, for certain specified offences or for gross unprofessional conduct. And the householder should be made by law to bear his share of responsibility with the physician in negligently or wilfully exposing others to the dangers of contagion.

It should also be the duty of the county health officer to offer free vaccination with pure bovine virus at stated times and places, perhaps twice a year in every school district. And at the outbreak of any serious epidemic within his jurisdiction he should be required to seek immediately the advice and aid of the State Board of Health.

A very important part of the duties of the county health officer, and of his assistant inspector, would be to investigate all complaints of nuisances, and to take the necessary steps for the abatement of the same. The county drain commissioners should be required to co-operate with him in their own important field of work, and he should always be ready to give them advice and aid in return. He should inspect schoolhouses and their surroundings, and his recommendations should be heeded by the school authorities. Inspections might be made, with economy of time, at his semi-annual visits of vaccination. Teachers might report to him by confidential letter cases of concealed contagious diseases in their districts, and he should have the power to authorize them to reject

from school attendance pupils from infected households. He should be empowered to forbid, under severe penalty, the public funeral of a person deceased of a "contagious, infectious, or pestilential disease," or the removal of such a corpse to some other place for burial, except upon conditions to insure the public safety. In short, there should be placed in his hands the execution of laws to prevent the sale of unwholesome food, to order the removal of foul organic matter from inhabited places, to prohibit the ignorant, the heedless, the lawless, from distressing and endangering their neighbors and their own households with unsanitary and indecent things and acts. A senseless, negligent, or wilful man has no more right to poison his wife and children with water from a well into which seeps the drainage of a rotten privy vault than with Paris green spilled into their food.

But I need not here enumerate all the elements of a complete system of sanitary administration. I do not forget that I am addressing a body of educated medical men, for whom details are unnecessary.

Of course, there are counties in the State the revenues of which would be too small to maintain a full sanitary corps. In some counties it would be necessary for the health officer to work single-handed. In a few instances it might be necessary for two counties to combine in order to employ a health officer at all. It might be better, however, to preserve the established territorial unit by giving, in a sparsely inhabited county, some physician the amount raised by taxation for purposes of public health, and allowing him to practise in connection with his sanitary work. In such places there would not be much medical competition, and consequently not much liability to conflict. On the other hand, there are many counties in the State with more than 30,000 inhabitants. There the sanitary fund would be proportionately larger and more assistants could be employed. In a few counties, containing important cities, it would be desirable to obtain the services of health officers of especial experience and ability, at salaries necessarily higher; but the larger sanitary income of such counties could be readily adjusted to the exigency.

The laws necessary to effect the important transaction from the present almost worthless township system to a county

system of fruitful sanitary administration are, for the most part, already in existence. The laws now on the statute-book should be codified, systematically arranged, and some important additions thereto should be made. The system proposed would simplify the work, increase the efficiency, and enlarge the powers of the State Board of Health. It would make sanitation general and uniform over the whole commonwealth, and would leave no local community at the mercy of ignorance, negligence, imbecility, indifference, wilful conceit, and stupid brutality. A township Board, consisting of men who don't know the difference between a nuisance and a mysterious providence, who offer a poor physician ten dollars a year for his services as health officer, would no longer remain in charge of the most vital interest of the people. A country justice, ignorant of law, especially mindful of votes, would not be left to ridicule sanitation before a jury of dull boobies collected in his house or in a tavern. It would shield the profession and protect the people from brazen pretenders, who practise medicine as a trade. It would eliminate the elements of antagonism between physicians and sanitary administrators. It would secure for the State reliable vital statistics worth the cost of publication. It would educate in the public service a body of health officers who would save ten times their cost in expenditures for doctors, drugs, coffins, and graves. It would add greatly to the productive energy of the people and the material prosperity of the State. Above all, it would lessen the torture of disease and save life. The establishment of such an all-pervading, practical system of sanitary administration would be the most important step toward the popular realization of the precious hygienic proverb—"Life is not to live, but to be well."

POISONING BY SULPHURETTED HYDROGEN.

A COMMUNICATION has been made to the Académie des Sciences by MM. Brouardel and Loye on the symptoms induced by the inhalation of dilute sulphuretted hydrogen (*La France Médicale*, September 5th). The experiments were made on tracheotomized dogs. When these animals were supplied with an atmosphere composed of two litres of sulphuretted hydrogen in one hundred litres of air, death ensued in two or three minutes. The pupil was noticed to dilate five to

eight seconds after the commencement of the inhalation, and the eyeballs became prominent. The pupil did not react to light. The vessels of the ocular fundus were much dilated. The cornea became quite insensitive; the skin could be stimulated without causing any reaction. Twenty seconds after the beginning of the experiment galvanization of the sciatic nerve by a powerful current did not give rise to muscular movements. In brief, there was disappearance of all reflex actions. After a little struggling the muscles became rigid, so that all the limbs were in a condition of forced extension, and the thorax was in a position of expiration. The contracture disappeared when the respiratory movements ceased. The urine and fæcal matters were forcibly expelled. After a few seconds the respiration became slowed, and afterward convulsive, as the animal began to struggle. In twenty to twenty-five seconds the respiratory movements completely ceased. If the animal be anæsthetized by chloroform the convulsive respirations are not observed. The respiratory rhythm is at first slowed, then accelerated, and gradually diminished in amplitude, and respiration ceases altogether in thirty to thirty-five seconds. If both vagi be cut before the inhalation is commenced, the phenomena are said not to be altered, and the respiratory changes do not take place earlier or later. The number of cardiac beats is diminished; there may be four instead of fifteen beats every five seconds. This infrequency does not persist, for the rate becomes normal again at the end of the first minute. The heart, though slowed, beats very strongly. The authors believe that the action of the gas on the centripetal nerves of the heart is the cause of the alteration in the cardiac rhythm. The heart does not die until respiration has ceased for two minutes. The auricles may be seen to beat for an hour after the thorax has been opened. The blood-pressure is first raised, then lowered. Excitation of the peripheral end of the vagus causes slowing of the heart all through the experiment. Galvanization of the sciatic nerve after twenty seconds have elapsed does not modify the blood-pressure. The blood coagulates rapidly, and in thin layers has a violet tint. The arterial blood analyzed after the arrest of the heart's action is said to contain enough oxygen to support life. When a mixture of half a litre of sulphuretted hydrogen in a hundred litres of air was inhaled, death fol-

lowed in from seventeen to fifty minutes. The ocular phenomena were the same as with the larger dose. The cornea, at first insensitive, becomes sensitive as the respiratory movements reappear. Contracture of the limbs is noticed fifteen seconds after the commencement of the experiment, but it disappears on the return of respiration, though it may recur several times. The respiratory movements are at first ample, then slowly cease, and disappear at the end of thirty seconds. One minute later powerful respiratory movements are observed. The inspirations gradually increase in amplitude, while the respiratory rhythm gradually diminishes till death. The respiratory capacity of the arterial blood is diminished. The urine often distends the bladder, and may contain both albumen and sugar. The muscles are said to respond to electricity after death, and excitation of the motor nerves is also efficacious. The authors regard the death from the stronger dose as due to the influence of the gas on the nervous centres alone, while in the weaker doses the nervous phenomena are complicated by those of asphyxia.

WHAT ARE CRUEL PUNISHMENTS?—Under the designation "cruel punishments," I include all such penalties for crimes as are designed to inflict direct physical suffering, accompanied by circumstances of ignominy. The whipping-post is an example. The infliction of such penalties proceeds upon the theory of *retaliation*, and, for this reason, is improper and vicious. The legitimate province of all laws relating to penalties for crime is *punishment* simply. Anything that is inflicted beyond this, whether *against* law, as by mob violence, or by *legislation*, as in the case of retaliatory punishments, exceeds the legitimate scope of penalties for crime. Punishment, in its proper acceptation, means the protection of society, as represented by the State, against the inroads of the individual upon its welfare, or, as it is called in criminal-law phrase, "the peace of the State." It is only when the encroachments of the individual upon the rights of others amount to a *public wrong* that they are punishable criminally, and then it is only the wrong to society, and not the sin, that is cognizable by the tribunals.—*From "The Whipping-post," by* LEWIS HOCHHEIMER, *in Popular Science Monthly for April.*

HEALTH OF THE U. S. ARMY FOR FEBRUARY, 1886.

DURING the month of February, in eight military departments, embracing 142 military posts and arsenals and 23 commands operating in the field, from which reports were received, there was returned a total mean strength of 24,800 officers and enlisted men.

There were admitted to sick report 2229 cases of disease and injury, or only 90 per 1000 of mean strength.*

This is a decrease of 17 per 1000 below that for February, 1885, and 52 per 1000 below the average monthly rate for the ten years, which was 142 per 1000 of strength. The average rate for February (as deduced from data for the ten Februarys of the decade) was 127 per 1000 of strength.

Fifteen deaths occurred, as against 24 for the previous month, and 13 for the previous February. This represents an annual mortality from all causes of 7.3 per 1000, or 5.4 per 1000 less than the average for the preceding decade, which was 12.7 per 1000 of mean strength.

The number of discharges for disability was 46,† representing an annual loss to the army from this cause of 22 per 1000 of strength.

The number of troops constantly non-effective from sickness was 936, or 38 per 1000 of strength, being 1 per 1000 less than the rate for last month. The rate for the previous February was 46 per 1000, and for the previous decade 44 per 1000 of strength.

The rate of recoveries to the whole number under treatment was 683 per 1000; the rate of deaths, 5 per 1000.

The average duration of treatment among patients who recovered was 10 days, and among those who died, 25 days.

* The names and diseases of all officers and enlisted men who are excused from any part of their military duty by reason of disability are required to be entered upon the reports from which these data are drawn.

† Recruits at depots, discharged for disability which existed prior to enlistment, not included.

TABLE I.

Causes of admission in the order of their numerical importance.	Number of cases.	Rate per 1,000 for February, 1886.	Average rate per 1,000 for ten previous Februarys.	Increase or decrease of rate.
First.				
Diseases of the respiratory system	449	18.10	28.60	—10.50
Catarrh	251	10.12	18.49	— 8.37
Bronchitis	175	7.06	7.85	— .79
Pleuritis	6	.24	.46	— .22
Pneumonia	5	.20	.70	— .50
Pulmonary phthisis	4	.16	.38	— .22
Others of this class	8	.32	.72	— .40
Second.				
Diseases of the digestive system.	353	14.24	?	?
Tonsillitis, pharyngitis, and sore throat	202	8.15	?	?
Constipation, dyspepsia, and colic	90	3.63	5.94	— 2.31
Others of this class	61	2.46	?	?
Third.				
Injuries and accidents	341	13.74	18.66	— 4.92
Contusions and Sprains	193	7.78	11.69	— 3.91
Incised, punctured, lacerated, and contused wounds	70	2.82	3.06	— .24
Freezing and frost-bite	15	.60	1.76	— 1.16
Shot wounds	6	.24	.34	— .10
Fractures (not shot)	4	.16	.50	— .34
Others of this class	53	2.14	1.31	+ .83
Fourth.				
Rheumatism	158	6.37	10.40	— 4.03
Fifth.				
Diseases of the nervous system	155	6.25	8.95	— 2.70
Headache and neuralgia	136	5.48	8.26	— 2.78
Others of this class	19	.77	.69	+ .08
Sixth.				
Diarrhœal diseases	132	5.32	10.26	— 4.94
Diarrhœa	123	4.96	9.54	— 4.58
Dysentery	9	.36	.72	— .36
Cholera-morbus	0	.0	.0	
Seventh.				
Venereal diseases	122	4.92	7.11	— 2.19
Gonorrhœa	55	2.22	3.54	— 1.32
Syphilis	39	1.57	3.51	— 1.94
Others of this class	28	1.13	.06	+ 1.07
Eighth.				
Malarial-fever and resulting conditions	105	4.23	9.31	— 5.08
Ninth.				
Enteric-fever	1	.04	.16	— .12
Tenth.				
Typho-malarial fever	1	.04	.05	— .01

The causes of deaths were as follows : Pneumonia, 3 ; valvular disease of heart, 2 ; phthisis pulmonalis, 1 ; enteric-fever, 1 ; Bright's disease, 1 ; diabetes mellitus, 1 ; chronic diarrhœa, 1 ; abscess of brain, 1 ; pyæmia, following gangrene from frost-bite, 1 ; hanging (suicidal), 1 ; acute toxic diarrhœa (imbibed some irritant poison while drinking), 1 ; poisoning by morphia (accidental), 1. The causes of admission, and those which have chiefly served to impair the health of the army during the month of February, are shown in Table I.

Among the more important diseases under treatment during the month of February—those remaining sick from the previous month being included—there were 9 cases of enteric-fever, 1 new case being reported ; 19 cases of pneumonia, 5 of which were new admissions ; and 22 cases of pulmonary phthisis, of which 4 were admitted this month. This is a decrease of 3 cases of enteric-fever, and 3 of pneumonia, from the whole number under treatment in January, and the same number of cases of pulmonary phthisis.

The ratio of mortality from enteric-fever to cases treated was 11.1 per cent, from pneumonia, 15.8, and from pulmonary phthisis, 4.5 per cent.

Of contagious and infectious diseases there were 8 cases of erysipelas, 1 of varioloid, and 1 of scarlet-fever, all newly admitted.

A comparison of the health of the several military departments may be seen in Table II.

Eighteen posts have shown admission rates for the month which were greater than the normal of 142 per 1000 of mean strength, and 124 less.

In the Department of the Platte, 25 per cent of the posts gave admission rates above the normal. In the Department of the Missouri, 20 per cent ; in the Department of California, 17 per cent ; in the Departments of the East and of Texas, each 15 per cent ; and in the Department of Dakota, 10 per cent. None of the posts in the Departments of Arizona or of Columbia had rates of admission that were above the normal.

The posts showing the highest rates were : Fort McKinney, Wyo. Terr., 378 per 1000 of strength. Indianapolis Arsenal, Ind., 333 ; Fort Myer, Va., 259 ; Jefferson Barracks, Mo., 233 ; Watervliet Arsenal, N. Y., 206.

TABLE II.

	Admission rate per 1,000 of mean strength.	Number of troops per 1,000 of mean strength constantly non-effective from sickness.	Average number of days treated among patients who recovered.	Rate per 1,000 of deaths to number of cases treated.
Department of:				
Platte	114	40	7	0
Missouri	110	43	9	2
East	99	41	10	9
Texas	97	45	11	4
Dakota	84	36	11	5
Arizona	69	32	10	7
California	58	32	19	0
Columbia	53	28	11	7
The entire army for the month	90	38	10	5
The entire army for the preceding decade, monthly average	142	44	?	7.5

The lowest admission rates were at Plattsburg Barracks, N. Y., 0; San Carlos, Ariz. Terr., 0; Fort Cummings, N. M., 0; Fort Mason, Cal., 0; Angel Island, Cal., 0; Benicia Barracks, Cal., 0; Fort Stockton, Tex., 14; and Fort Elliott, Tex., 15 per 1000 of mean strength.

Forty-three posts have shown rates of constant non-effectiveness from sickness above the normal of 44 per 1000 of mean strength, and 96 below.

In the Department of Texas, 46 per cent of the posts furnished rates of constant non-effectiveness from sickness above the normal. In the Department of Arizona, 40 per cent; in the Department of the Missouri, 33 per cent; in the Department of Dakota, 29 per cent; in the Department of the East, 26 per cent; in the Departments of the Platte and of Columbia, each 25 per cent; and in the Department of California, 17 per cent.

The posts showing the highest constant rates were: San Diego Barracks, Cal., 286 per 1000 of strength; Jefferson Barracks, Mo., 96; Fort McKinney, Wyo. Terr., 91; Camp Poplar River, Mon. Terr., 81; Fort Randall, Dak. Terr., 76; Fort Wingate, N. M., 73; while the lowest rates were:

San Carlos, Ariz. Terr., 0; Fort Mason, Cal., 0; Angel Island, Cal., 0; Fort Cummings, N. M., 1; Fort McDermit, Nev., 2; Benicia Arsenal, Cal., 2; Fort Niagara, N. Y., and Fort McDowell, Ariz. Terr., each 8 per 1000 of mean strength.

At stations showing high admission rates, catarrhs, rheumatism, diseases of the digestive system, malarial-fever, and diarrhœa have prevailed.

The causes producing high constant rates were: Pulmonary phthisis, pneumonia, catarrh, tonsillitis, and injuries.

During the month of February, enteric-fever was reported from 7 stations. The only new admission for this disease during the month occurred at Fort Keogh, Mon. Terr., terminating fatally in 10 days.

Pneumonia existed at 17 stations, as against 19 for January and 16 for December. The cases newly admitted occurred at Fort Wayne, Mich., 1, with fatal termination in 4 days; Fort Bowie, Ariz. Terr., 1, with fatal result in 6 days; Fort Hays, Kan., and Fort Bayard, N. M., 1 case each, and another in a field command at Bisbee Cañon, Ariz. Terr. At Fort McHenry, Md., 1 death was reported in a case remaining from previous month.

The average length of treatment in fatal cases was 13 days.

Erysipelas was reported at Fort Totten, Dak. Terr., 5 cases; at Columbus Barracks, Ohio, Fort Bayard, N. M., and Fort Lewis, Col., 1 case each.

Varioloid, 1 case, at Fort McIntosh, Tex.

Scarlet-fever, 1 case, at Fort Riley, Kan.

The post surgeon at Fort Totten, Dak. Terr., states that he endeavored to ascertain the cause of the outbreak of erysipelas at that post, but was unable to fix upon any cause. That the hygienic condition of the post was good, and that the men who were attacked, with one exception, were not addicted to immoderate use of intoxicating liquors, and neither had they undergone any unusual exposure. That the disease also prevailed among the children at the Indian mission, and among the Indians residing away from the agency. He further states that he is inclined to believe that the disease was due to some peculiar condition of the atmosphere not known, and perhaps to the cold and damp state of the atmosphere there during the month.

The post surgeon at Fort McIntosh, Tex., in his sanitary report dated February 6th, stated that a case of varioloid occurred at that post on the 18th of January, in the person of a soldier who had been re-vaccinated successfully with bovine lymph on March 12th, 1884; also that a second case appeared, later, in the person of another soldier of same company, who had also been successfully re-vaccinated on March 12th, 1884.

The post surgeon at Fort Stanton, N. M., reported 5 cases of purulent conjunctivitis during the month, with the following explanation: "The origin of the outbreak of purulent conjunctivitis can only be conjectured. Its apparent limitation to one troop of cavalry does not, I am confident, possess any important significance, except to emphasize the influence of accident. I have personally investigated the conditions under which the soldiers of this troop now live, with special reference to the occurrence of this disease.

"The altitude of the post is considerable. The atmosphere is rare. The consequent variation of temperature between the day and night is great. One is chilled in a few minutes when out about sunset. The post is in a narrow valley, in a tunnel, as it were, at one extremity of which arises, to the height of perpetual snow, a group of mountains, the Sierra Blanca range. After the fall of the year the rains cease in this locality almost altogether. When the sun has heated the atmosphere of the valley, each morning, a draught from the cold mountain-tops is established, constituting a wind, which is rarely so mild as to be denominated a breeze. It more often blows with the violence of a hurricane. This dries the surface of the earth within its limit, as well as things upon the surface. Through the influence of the winds the atmosphere is full of dust and other impurities, mingled with and supported by dust particles. Not enough of moisture is precipitated to cleanse the air. It is known to observing people that rain-water stored in receptacles here will take on putrefaction very promptly. I believe that the atmosphere contains the impurities, which it has swept from the ground, that confer upon susceptible individuals the purulent conjunctivitis, from which several soldiers have been suffering at this post.

"The circulatory disturbances caused by the direct influence of the cold winds lend assistance. The very large herds of

cattle to be seen constantly in this narrow valley deposit upon the ground an immense amount of filth, part of which is taken up into the atmosphere above the surface of the ground by the winds.

"Purulent conjunctivitis is not confined to this post. It is elsewhere in the vicinity. Abscesses are not uncommon. There are reports of an epidemic affection having the nature of scarlatina or diphtheria, it is not known which, at the distance of ten or twelve miles. Erysipelas is said to prevail below the post."

Small-pox is reported both at Tularosa and at Three Rivers.

Reports received from 23 commands operating in the field showed an aggregate mean strength of 2226 officers and enlisted men.

Ninety-nine cases, or 44 per 1000 of mean strength, were admitted to sick report during the month, of which number 7 were transferred to permanent stations for treatment, and appear upon their returns.*

Of these admissions 77, or 78 per cent, were for disease, and 22, or 22 per cent, for injuries.

Eighteen commands were operating or *en route* in the Department of Arizona, their strength aggregating 1855 officers and enlisted men, with 76 cases of disease and injury, or 41 per 1000.

Two commands in the Department of the Platte, representing a total mean strength of 137, with 11 cases of disease and injury, or 80 per 1000. In the Department of Columbia, 1 command of 192 officers and enlisted men, with 9 admissions to sick report, or 47 per 1000. The Department of the East had 1 command of 28 officers and enlisted men, with 3 admissions to sick report, or 107 per 1000. The Department of Texas had 1 command, with a mean strength of 14 officers and enlisted men, and none sick.

The prevalent disorders among troops in the field were diarrhœal diseases, rheumatism, bronchitis, and injuries.

Attached to the army, and living at the different military stations, were 5126 women and 6230 children, the wives, children, and servants of the officers and enlisted men.

* To avoid duplication, these cases are dropped in the final consolidation for the entire army.

Among the women were reported 428 cases of sickness during the month, or 83 per 1000 living. Four deaths occurred, representing an annual death rate of 9.4 per 1000 living.

The causes of deaths were reported as follows: Syncope followed by heart clot, 1; dilatation of the heart, 1; valvular disease of heart, 1; consumption, 1.

Among the children 382, or 61 per 1000, were taken sick.

Three deaths occurred (all under five years of age), representing an annual death rate, at all ages, of 5.8 per 1000 living.

The causes of deaths were reported as follows: Failure of heart, 1; tubercular peritonitis, 1; unknown, 1.

Whooping-cough was reported among the children at Fort Keogh, Mon. Terr., 9 cases; also at Fort Snelling, Minn., and Vancouver Barracks, Wash. Terr.

Measles, at St. Augustine, Fla., 6 cases; at San Antonio, Tex., 2 cases; and at Fort Niobrara, Neb., 1 case.

Diphtheria, at Benicia Arsenal, Cal., 2 cases; at Watervliet Arsenal, N. Y., 1 case.

Scarlet-fever, at Fort Riley, Kan., 3 cases.

The prevalent diseases among this class were: Catarrh, bronchitis, common colds, tonsillitis, and other diseases of the digestive system.

WATERED SUGAR.—Vermonters at least will appreciate this seasonable story of one of their fellow-countrymen: Ike Sloan was a farmer, like all other Vermonters, but wasn't exactly one of the type whose "critters" and vegetables always bring more money than other people's. On the contrary, if there was any difference between the price that he got for his products and the market rate it was generally to his disadvantage. One day on his way back from the village he complained bitterly to the people with whom he gossipped along the road that the storekeeper had abused him most shamefully by giving him only nine cents a pound for his maple sugar. "But, gol dern him," said Sloan with a chuckle, "I got even with him, for I put more'n two dozen bucketfuls of water into the sap before I b'iled it!"—*Boston Record.*

THE PROGRESS OF EDUCATION IN THE UNITED STATES.

ABSTRACT OF THE REPORT OF THE COMMISSIONER OF EDUCATION FOR 1883–84.

THE fourteenth annual report of the Commissioner of Education, recently issued, brings the record of education in the United States up to June 30th, 1884. In certain particulars in which the preceding report could not be brought up to June 30th, 1883, but ended with June, 1882, the statistics for 1883 are inserted in the present report, but distinct from those for 1884.

The report contains abstracts of the official reports of the school officers of States, Territories, and cities, 314 pages, and statistical tables relating to education in the United States, 620 pages. These, with the commissioner's report proper, 271 pages, and the index, 9 pages, make up a volume of 1214 pages.

With reference to the work of the office itself, the commissioner says:

"It is impossible to review the experience of the last fourteen years without being impressed with the increase in the amount of information collected, in the sources of information that have been brought under contribution, and the improved character of the information supplied."

The increase of the material that must be used in the preparation of the annual reports and other publications, for which there is a constantly growing demand, the rapid growth of the library and museum, and the corresponding increase in the number of teachers, students, and school officers who consult these, call for larger appropriations and for additions to the clerical force.

The number of volumes in the library has increased to 16,500, and the number of pamphlets to 42,100. The library meets a want universally acknowledged among intelligent

educators, containing as it does sources of information nowhere else accessible in the United States. It has been built up to its present importance by a system of exchanges and the most economical use of an annual appropriation for books, which appropriation has been cut down from $1000 to the niggardly sum of $500 for the ensuing year.

No specific provision has ever been made by Congress for a librarian for this valuable collection. It has been necessary, therefore, to draw upon the clerical force of the office for the cataloguing and care of the books. The commissioner regrets that it is as yet impossible to proceed with the printing of the card catalogue, a large portion of which is in manuscript.

The documents sent out from the office during the year numbered 258,340; to a considerable extent they were placed in the hands of teachers and attendants upon normal institutes. Among the topics treated in these publications were: Recent school law decisions; Illiteracy in the United States in 1870 and 1880; Teaching, practice, and literature of shorthand; Proceedings of the department of superintendence of the National Educational Association, and Industrial art in schools.

From a table giving the statistics of State systems of public instruction, it appears that the school population is, for 38 States, 16,510,463; for 10 Territories, 283,939, or a total of 16,794,402; enrolment in public schools (38 States), 10,572,-751; (10 Territories), 165,441, or a total enrolment of 10,738,-192; daily average attendance (38 States), 6,590,582; (9 Territories), 103,346, or a total daily average attendance of 6,693,-928. If to the enrolment in public schools be added that of private schools, as reported for 23 States and 2 Territories—viz.: 606,517, it will be seen that 11,344,709 youth, or 67 per cent of the school population, have been brought under instruction during the year. It should be observed that school population bears to total population a ratio varying in the different States and Territories by reason of the variations in the legal school age. Eighteen different school ages are reported, the longest being from 4 years of age to 21, the shortest from 8 to 16.

The number of public-school teachers reported, all States and Territories included, is 307,804. Thirty-four States and

7 Territories make a distinction of sex in reporting this item. For the former the number of male teachers is 101,307; of female teachers, 170,620; for the latter the numbers are, respectively, 1476 and 3156.

The average salary of teachers per month is reported from all the States, excepting Arkansas, Florida, Georgia, and Texas, and from all the Territories excepting Indian Territory. In those States in which no distinction of sex is made in reporting this item (viz.: Alabama, Delaware, Indiana, Kentucky, Louisiana, Maryland, Mississippi, Missouri, New York, North Carolina, and Tennessee), the average salary ranges from $27.87 (in Kentucky) to $47.75 (in Missouri). The report from Kentucky includes only white county schools. In this State the average salary for teachers in city graded schools for whites is $71.25. For the States not included in the foregoing statement the lowest average salary per month is, for men, $26.92 (South Carolina); for women, $16.28 (Maine). Nevada reports the highest salaries: for men, $140.50; for women, $96.01. In the Territories average salaries for women range from $28.80 (Utah) to $61.27 (District of Columbia); for men, from $38.43 (Arizona) to $91.13 (District of Columbia). The annual salary depends upon the length of the school year, which varies from an average of 78 days in Tennessee to 210 days in Arizona.

In a general review of the record of public education for the year, the commissioner says:

"Efforts have been made in certain sections to direct public interest toward denominational schools, and in others to limit the free schools to the most elementary work. Here and there such efforts have hindered the progress of free schools, but on the whole they have had the contrary effect. The growth of the free-school system in the South, the interest manifested in the Eastern and Western States in various measures for the improvement of the schools, the attention given to the subject by the public press and public societies, the enthusiasm displayed at the meeting of the National Educational Association at Madison, Wis., show that on the whole the public-school system is stronger than ever in the confidence of the people."

Wherever proper provision is made for the inspection and

supervision of rural schools, excellent results follow. Union of districts and the adoption of the township for the district system are measures that have greatly promoted the efficiency of this class of schools, and experience abundantly illustrates the advantage of definite classification by means of graded courses of study, or, where it is practicable, by the formation of primary and intermediate classes under different teachers. Grading in the country schools leads to provision for branches a little in advance of those that the school laws make obligatory, prevents the early withdrawal of pupils, and increases the number who advance to the high schools. It may also be easily shown that grading is an economical provision.

With reference to the teaching force the commissioner says:

"The efforts made within the last few years to improve the teaching force of the country schools have had some degree of success. It is now required in all the States that candidates for the service shall pass the examination for a teacher's certificate or present the diploma of a normal school. It remains to raise the standard fixed for the lowest certificate (which represents virtually the average qualification of the teachers), to remove the examination from local and partisan influences, and to offer fair wages for competent teachers. In a few localities this has been done, but, as a rule, the tests of qualification, the modes of appointment, and the inducements offered competent teachers to remain in the work are not such as should satisfy an intelligent people. The most hopeful indication in the matter is the very general effort made by school officers to arrive at an understanding of the exact status of the teaching force in the several States."

The following States have, by special enactment, made instruction in the effects of alcoholic liquors obligatory: New Hampshire, Vermont, Rhode Island, New York, and Michigan. In some other States—as, for instance, Massachusetts—instruction in physiology, hygiene, and temperance has long been required.

BRIEF SUMMARY OF THE EDUCATIONAL CONDITION OF THE UNION.

Maine.—The school statistics of Maine show increase in expenditures and in the number of schools giving instruction

above the rudiments. Teachers' salaries have advanced in a number of districts; the length of the school term decreases about a day each year.

New Hampshire.—Increase is reported in New Hampshire in the following items: Number of schools, enrolment, length of school term, teachers' salaries, and general expenditure. The average attendance, which increased in 1882–83, fell off in 1883–84 by 2348. Several small school districts have been consolidated, to the material advantage of the schools.

Vermont.—Expenditures for school purposes have increased in Vermont, and increased wages have stimulated teachers to better efforts. Enrolment and average attendance have fallen off somewhat in the last two years, but the per cent of enrolment to school population is very fair, being about 73 per cent. The adoption of the township for the district system in several instances has proved advantageous. The number of graded schools reported is 33.

Massachusetts.—Children of school age (5–15) increased in this commonwealth in 1882–83 by 8082 from the number reported in 1881–82, and, as usual, a much larger number than the youth of school age was brought into the public schools, the per cent of enrolment to school youth being 101.95. The next year, though 6736 more school youth were reported, the enrolment rose to 6140 beyond that in the year before, making a per cent of 101.73 to the whole number of school age. The per cent of average membership and of average attendance to school youth (89.47 and 89.51 in the former case, 73.47 and 73.82 in the latter) is, in its way, equally remarkable. Adding the attendance in State charitable and reformatory institutions, that in the numerous evening schools, and that in academies and private schools, the educational status is wonderfully high.

Rhode Island.—The percentage of youth of school age enrolled in the schools of Rhode Island increased from 73.07 in 1882–83 to 77.54 in 1883–84, and the per cent of daily attendance to such youth from 48.89 to 52.24, the number in all schools, private and public, coming in both years close up to the whole number of school age. A new compulsory law, passed in 1883, had, doubtless, some effect on this increase of attendance; but the State school commissioner thinks that it

was much more the result of better teaching, increased attractiveness in the schools, and wider interest in education.

Connecticut.—In 1882–83, with more children for instruction, there was a somewhat smaller enrolment in public schools, with a smaller per cent of attendance in all schools than in 1881–82; but average attendance increased by 1437, total attendance in all schools by 1213, a new and elegant State Normal School was built, and great improvements in school buildings at Bridgeport, Hartford, New Haven, and elsewhere were made at a cost of $565,752.

In 1883–84, with a very small increase of school youth and a diminution in the number attending other than public schools, there was an increase of 2843 in public-school enrolment and of 1652 in average attendance in the winter term, children in no school diminishing by 335. Then, too, though it was a year of calamity in business, 5 more public-schools were opened, 18 more graded schools were taught, the departments in these numbering 44, and the State school property was rated almost $1,000,000 higher.

New York.—The school year 1883–84 was an exceptional one in this State, in that it was shorter by about 6 weeks than usual, owing to the fact that the Legislature in 1883 changed the day of its close from September 30th to August 20th. This will account for a falling off in certain statistical details which, from their nature, are necessarily affected by time. In particulars not thus affected, the reports show decided improvement over the year preceding, while the public-school work in 1882–83 had also improved in many respects over that of 1881–82. With about 41,000 fewer pupils enrolled in 1883–84, the average daily attendance was 13,000 greater, the per cent of attendance based on enrolment was greater by 3.60, and the same based on the whole number of youth of school age was over half of 1 per cent greater. More teachers were employed 28 weeks or over, although the whole number was less, and more attended the institutes. Over $177,000 more were expended for sites, buildings, and furniture, the estimated value of all public-school property reaching nearly $32,000,000.

New Jersey.—During 1882–83 there were in this State over 349,000 youth of legal school age (5-18), of whom nearly

212,000 were enrolled in public schools and nearly 120,000 were in average daily attendance, the per cent of public-school enrolment to the number of school youth being 60.69, and that of average attendance to school population 34.22. Counting the enrolment in private and church schools, there were 260,612, or 74.62 per cent, engaged in study during some portion of the year. The records for 1883–84 having been consumed in a conflagration at the State House, figures for illustration of educational progress in that year are wanting.

Pennsylvania.—The public-school statistics of Pennsylvania show that in 1883–84 enrolment increased by 8000 over that in 1882–83, and average daily attendance by 9000. Nearly 20,000 free schools are reported from 2241 school districts, 8345 of the schools being graded. Over nine and a half millions were expended for school purposes. The average monthly salary of women teachers decreased by a little more than 50 cents, while that of men teachers advanced $1.44. There was an increase in the number of teachers employed continuously and in the number of normal graduates employed.

Delaware.—The statistics for Delaware show an enrolment of about 31,000 pupils in the public schools in 1884, including schools for colored youth, a gain of about 4300 in that year, the whole school population of both races (numbering a little over 40,500) having only increased by about 2000. The exact number of white children enrolled was 27,037, a gain of 3587 over 1882; the average daily attendance of the same class (17,952) increased 2396. The length of term remained about the same in both classes of schools, that for white children numbering 157 days, that for colored 104. The whole cost of sustaining the white schools was $206,918; that for the colored schools, $8243. Public sentiment appears to be more favorable to free schools than ever before.

Maryland.—About 55 per cent of the youth of school age in this State were enrolled in public schools, about 28 per cent of them being in average daily attendance. Of the whole number (170,393) enrolled, 31,327 were colored, and 12,574 of that race were in daily average attendance, a fair advance for the year in both these items. The expenditures in 1883–84 as compared with 1882–83 show increase of $117,000, of which $50,000 were for teachers' salaries.

Virginia.—The enrolment in the public schools of Virginia for 1883–84 was in round numbers 288,000, of whom 103,000 were colored. The average daily attendance was about 163,000, or 29.39 per cent of the school population as given in the census of 1880. The number of schools increased by 376, expenditure for school purposes by nearly $24,000, and valuation of school property by about $150,000. There was a slight rise in teachers' salaries.

North Carolina.—In North Carolina there is increase in the enrolment in free schools, average attendance, number of schools, and number of teachers. The teachers also give evidence of better training. Altogether the improved school law of 1881 has accomplished much good.

South Carolina.—The statistics for South Carolina show increase in the number of schools and in enrolment and average attendance. Very few school-houses are owned by the districts, and the valuation of school property declined in 1883–84.

Georgia.—The latest report from Georgia shows progress in all essential particulars. To accommodate the increased attendance 380 new schools were provided. The number of graded and high schools increased by 32 ; expenditure for free schools by $29,473.

Florida.—The report of the public-school system of Florida for 1883–84 is much more complete than those of previous years. The number of schools and the enrolment in them have increased. Provision has been made for the better training of teachers, and a law has been passed requiring county Boards of Education to select and to use for at least 5 years a uniform series of text books in their schools.

Alabama.—The school statistics of Alabama for 1883–84 show that about 51 per cent of the whole school population were enrolled in the public schools, and that about 62 per cent of these were in average daily attendance. There was an increase in the number of public schools taught for white and colored, in the average school term for the State, and in the whole amount expended for public schools.

Mississippi.—The increased favor with which the public-school system is regarded in Mississippi is shown by the more prompt payment of the school tax, the general extension of

the school term beyond the constitutional minimum of four months, and the disposition of the people to employ more competent teachers. In 1883 the youth of school age numbered 447,571 (180,000 white and 267,571 colored); the enrolment of white children was about 125,000, and of colored a little above 141,000. The average daily attendance was, for both races, 154,463. The expenditure for schools amounted to $803,876.

Louisiana.—The public-school statistics from Louisiana are incomplete, and those given are not at all encouraging, showing, as they do, only 55,838 enrolled and 38,615 in average attendance. More public schools were reported, however, and $57,878 more were expended on them. Encouragement for the future was drawn from the fact that the Legislature in 1884 increased the State appropriation for public schools from one mill to one mill and a half on the dollar, which, it is supposed, will add about $100,000 to the school revenue. It also stopped the diversion of the school fund to collegiate purposes, a practice which had in the past much lessened the funds available for public schools.

Texas.—The public-school statistics of Texas are incomplete, 41 counties failing to report. Those reporting show increase in enrolment and attendance, with an expenditure for school purposes of $1,661,476. The State superintendent confirms the favorable view presented by the statistics. He expresses the belief that free schools have passed the experimental stage in that State and are now firmly fixed in public confidence.

Arkansas.—Considerable progress is indicated by the reports from Arkansas for 1883–84, but an improved school law is needed to secure better administration and more complete reports of the system. The reported enrolment is 40,983; several districts failed to make returns.

Kansas.—The reports from Kansas show progress in all essential particulars of the school system. Well-trained teachers are employed in a large portion of the State; in this respect the western portion needs further improvement.

Missouri.—The school statistics of Missouri for 1882–83 show progress in nearly all respects. In 1883–84 there was still further increase in enrolment, school attendance, number

of schools, and expenditure for the same. The valuation of school property and the length of the school term diminished somewhat. The available school fund is apparently the largest in the Union, being $10,178,806.

Kentucky reports nearly 51 per cent of the white youth of school age and over 36 per cent of the colored enrolled in the public schools. For the former the average attendance is 32 per cent of the school population, and for the latter, 25 per cent. Advance is noted in nearly all particulars excepting the pay of teachers.

Tennessee.—Reports from Tennessee show that the State is recovering from the educational depression of 1882. The united average attendance in State and private schools in 1882–83 was 196,380, and increased the next year by 36,448.

West Virginia.—The free schools of West Virginia are in excellent condition as regards enrolment, attendance, and instruction. Nearly 73 per cent of the school population are enrolled, and an average attendance of 45 per cent is maintained. As compared with 1882–83, the report for 1883–84 shows that the number of schools increased by 138; school-houses, by 152; teachers from normal schools or with large experience in their work, by 184; expenditure for schools, by $50,060; available school fund, by $4854; and valuation of school property, by $29,574.

Ohio reported in 1883–84 over 1,082,000 youth of legal school age (6–21) and 762,755, or 70 per cent, enrolled in public schools, of whom about 499,000 were in average attendance. These figures show an increase for the year of more than 7000 in the number enrolled in public schools, and of over 10,000 in that of average daily attendance, while the number of pupils in private schools fell off from 31,470 to 10,957. Increase is also noted in length of school term, number of school-houses, number of teachers permanently employed, and in the amount expended for school purposes, which reached a total of $9,684,369. The country schools suffer from the want of competent supervision.

Indiana reports over 501,000 youth enrolled in public schools in 1883–84, and over 325,000 in average daily attendance, with about 722,851 youth of legal school age (6–21), or 69 per cent of the school population, enrolled and 45 per cent

in average attendance; schools taught 126 days; more than $4,500,000 expended on them, and public-school property valued at more than $13,500,000. The figures show an increase in nearly all the items which indicate effective school work.

Illinois, with over 1,069,000 youth of legal school age (6–21), reported in 1883–84 an enrolment of 728,681 in public schools and 485,625 in average daily attendance, or about 68 per cent of the school population enrolled and nearly 46 per cent in average attendance. There were also 75,821 attending private or church schools, which, added to the number in public schools, would give 75 per cent of the school population under instruction during some portion of the year. Nearly 12,000 public schools were taught, the average term for the State being 151 days, and $9,628,186 were expended on them. The statistics, as for years past, continue to show an advance in nearly all the items reported.

In *Michigan*, of about 577,000 youth within the legal school age (5–20), over 400,000, or 70 per cent, were enrolled in public schools, besides 27,130 in private schools. Public schools were taught for a term of 152 days, at a cost of over $4,636,000, in school-houses valued, with other school property, at nearly $11,000,000. The figures show an increase for the year of more than 13,000 in the number of pupils attending public schools, and of about 4500 in the attendance on private schools, of 4 days in the average public-school term throughout the State, of about $509,000 in the valuation of public-school property, and of $376,462 in the amount expended on public schools. There was also a slight advance in the pay of teachers, the average monthly salary of men being $1.93 more, and that of women $1.10 more.

Wisconsin.—The statistics for Wisconsin show that, of 528,750 youth of legal school age (4–20) in 1883–84, nearly 317,000, or about 60 per cent, were enrolled in public schools, an increase for the year of over 7000 in enrolment and 18,625 in school population. The reported attendance on private schools (15,616) decreased considerably during the year, but these statistics were incomplete, many large cities having failed to report on this point. About 83 per cent of all the children between 7 and 15 years of age attended public schools,

an increase for the year of 3466, and for 2 years of 14,691; and the superintendent thinks that fuller statistics on this point would show that nearly all of that age attended during some portion of the year.

Minnesota, with 359,366 youth 5 to 21 years of age in 1883–84, enrolled 223,209 in public schools, or 62 per cent, and had 100,637, or 28 per cent of school youth, in average daily attendance. The schools were taught an average of 112 days throughout the State, at a cost of $2,819,711, in 4671 school buildings, of which 301 were new, valued, with sites and other school property, at $5,415,599. These figures show an increase for the year of about 13,700 in enrolment and 8500 in average attendance, against an increase of 22,000 in youth of school age. There was also an increase in the number of teachers employed, in the number who had taught 3 years or more, and in that of normal-school graduates, in the average pay of both men and women, as well as in the whole expenditure for all school purposes and the valuation of school property.

Iowa reported over 621,000 youth of school age (5–21) in 1883–84, with about 469,500 enrolled in public schools and 300,000 in average daily attendance, or over 75 per cent of the school population enrolled, and 48 per cent in average attendance; schools taught an average of 140 days in 13,624 buildings, valued, with other school property, at over $10,430,000, and about $5,856,000 expended during the year for public-school purposes. These figures show an advance of 8 per cent in the proportion of school population enrolled, and of 6 per cent in the proportion of school population in average attendance.

Nebraska.—With 209,436 youth of legal school age (5–21), Nebraska reports 137,618, or nearly 66 per cent, enrolled in public schools, and 81,430, or nearly 39 per cent, in average daily attendance, an increase during the year of 11,489 in enrolment and of 10,238 in average attendance, with 24,379 more youth of school age. More school districts were reported and more in which schools were sustained 6 months, the average term for the State; more school-houses were built; the valuation of school property increased, as did the number of teachers employed, their average pay, the whole

amount expended for public schools, and that of the school funds, permanent and temporary.

Colorado.—Colorado reported, in 1883–84, 56,242 youth of legal school age (6–21) and 37,872 enrolled in public schools, of whom 23,307 were in average daily attendance, or 67 per cent, of the school population enrolled, and 41 per cent in average attendance; graded schools taught 174 days; ungraded, 100; school-houses numbering 525 and valued, with other school property, at about $125,000; and $809,898 expended for all school purposes. An advance for the year is indicated by the figures in nearly all respects except as to percentages of the school population enrolled and in average attendance, these decreasing slightly.

Nevada.—The decline of mining interests in Nevada and the comparatively slow growth of other industries have their effect in diminishing the population. Enrolment in all schools declined somewhat in 1882–83, and again in 1883–84. The percentages of enrolment and average attendance show increase. Seven new schools are reported, of which 5 are graded.

California.—Reports from California show increase in 1882–83 and 1883–84 in the number of school youth, in enrolment in the public schools, and in average attendance. Expenditures for the schools and the valuation of school property also increased. The number of teachers holding life diplomas, educational diplomas, or evidences of graduation from normal schools indicates an improvement in the teaching force of the higher-grade schools. There was a falling off in the number of teachers holding first-grade county certificates.

Oregon.—Reports show improvement in all essential particulars for this State. In 1883–84 9 more graded schools were reported than in the previous year, while the value of school property increased by $631,096, and the permanent school fund by $167,478.

The Territories.

Alaska.—The principal schools in Alaska are still those sustained by the Presbyterian Church and situated in the south-eastern portion of the Territory.

The recent establishment of a government for Alaska, with an appropriation of $15,000 for industrial schools and $25,000

for other schools, will doubtless give a powerful impetus to education in this Territory.

Arizona.—Reports from Arizona show increase in the number of schools taught, in the average length of term throughout the Territory, in the number of school-houses, value of school property, amount expended on the schools, and in the pay of teachers, who were becoming better qualified for their work.

Dakota.—Under an intelligent and active superintendent schools and school work have greatly advanced in this large Territory, the increase in 1882–83 being 17,661 in school youth, 8537 in enrolment, 389 in reporting districts, 385 in public schools, 317 in school-houses, and $217,841 in expenditure for schools. The next year shows a further advance of 21,023 in youth, of 16,043 in enrolment, of 11,960 in daily attendance from the first report of it in 1882–83, of 602 in districts, of 592 in schools, of 785 in school-houses, and of $774,554 in school expenditure. An improvement in the school law has resulted in the establishment of a township system in at least 50 counties.

District of Columbia.—The public schools of the District of Columbia have reached a high degree of efficiency, being almost without exception in charge of normal graduates or of teachers of long experience. In 1883–84 the expenditure for public schools fell below that of the preceding year by $109,994; valuation of school property increased by $90,000.

Idaho.—The school statistics for Idaho are incomplete, but so far as reported they show steady improvement.

Indian Territory.—Under the head of Indian Territory is embraced not only the report of the instruction given to the school youth of the Five Nations, but all education of Indians in the United States. The record shows continuous improvement. Of the school youth included here, 37.14 per cent were enrolled in 1883–84 and 22.02 per cent were in average daily attendance.

It is estimated that as a result of the efforts made in the schools 71,194 Indians in the United States are now able to express their thoughts to some extent in English.

Montana.—Steady improvement in school affairs is reported from Montana. Nearly 54 per cent of the youth of school

age are enrolled, and nearly 30 per cent in average attendance, notwithstanding that the school age in this Territory extends from 4 to 21, and that very few attend school under 5 or over 15. The superintendent thinks that nearly all the children in the Territory between 5 and 15 were under instruction in public or private schools.

New Mexico has no superintendent of public schools, and no information as to the condition of educational interests therein has been received for several years past.

Utah.—The school statistics of Utah show 48,889 youth of school age (6–18) in 1884, of whom 29,325, or nearly 60 per cent, were enrolled in public schools, and 19,073, or 39 per cent, were in average attendance, the schools having been taught throughout the Territory an average of 135 days, at a cost of $204,340.

Washington Territory.—Washington Territory reports a prosperous condition of school affairs. In 1883–84, with 31,599 youth of school age (6–21), there were 22,341, or over 70 per cent, enrolled in public schools, and 14,223, or 45 per cent, in average daily attendance. Schools were taught an average term of 92 days in 652 houses, at a cost of $287,590.

Wyoming.—No report has been received from the large Territory of Wyoming for either the year 1882–83 or 1883–84.

COMPARATIVE STATISTICS OF EDUCATION IN THE SOUTH.

The following statistics are derived from a series of tables having reference to school provision for the colored population of the South :

Total white school population of 16 States and the District of Columbia, 4,216,976 ; enrolment in public schools, 2,546,-448 ; colored school population, 2,032,926 ; enrolment, 1,002,313. Total public-school expenditure for both races, $17,053, 467. For the further instruction of the colored race there are reported 56 normal schools or normal departments, with 366 instructors and 10,771 students ; 47 institutions for secondary instruction, having 226 teachers and 8695 students ; 21 universities and colleges, having 178 teachers and 3177 students ; 26 schools of theology, with 79 teachers and 800 students ; 4 schools of law, with 15 teachers and 99 students ; 3 schools of medicine, with 25 teachers and 141 students, and

7 schools for the deaf and dumb and the blind, having 29 teachers and 123 students. The total provision for the instruction of the colored race in the section considered is, including public schools, 17,767 institutions, in which there is a total enrolment of 1,026,119 pupils.

The commissioner calls attention to the increase of school funds in this section of the country, amounting since 1882 to $2,000,000. Notwithstanding this and other evidences of prosperity, there is, in his judgment, need of larger provision for the instruction of the illiterate of the South than the States are by themselves able to make. In this connection he says:

"Almost without exception, the State and school officers of the Southern States are agreed that their States can do no more at present. They admit their increasing prosperity; they point, as they may well do, to the rapid increase in their school funds, amounting, as our tables show, to something over $2,000,000 since 1882; but over against these facts they call to mind the continued depression of all valuations in their midst, the long prostration of business, their want of school accommodations and of trained teachers, and, above all, the burden of illiteracy which rests upon them, and they declare that this illiteracy cannot be overcome by means of the State and local funds as rapidly as the interests of the particular States involved and of the entire nation demand. We have even more impartial testimony upon this point.

"Hon. J. L. M. Curry says in his latest report to the trustees of the Peabody fund:

"'The States which comprise the field of the operations of the fund gradually increase in their material resources. With advancing prosperity come corresponding ability and inclination to foster general education. With increased taxable property school revenues increase.'

"But, while this admission was fully confirmed by the knowledge of the trustees themselves, the facts as known both to them and to their agent were still such as to lead them to renew their appeal to Congress for Federal aid."

Since 1882 enrolment in the colored schools of the Southern States and the District of Columbia has increased by 199,331, and, as a rule, average attendance has proportionately increased. The commissioner observes that "evidences are not

wanting that work carried on in the past has effected a great improvement in the morals, industrial habits, and general intelligence of the colored people. This is more and more apparent to me as official duty calls me year after year to renew my personal observation of different sections of the South, and my opinion is confirmed by the statements of many eminent men, thoroughly familiar with the field."

PEABODY AND JOHN F. SLATER FUNDS.

The disbursements from the Peabody fund amounted in 1884 to $59,995; total disbursements from 1868 to 1884, inclusive, $1,476,579. The stimulating influence of the fund extends far beyond the limits of the pecuniary aid afforded. The present agent, Hon. J. L. M. Curry, has continued the policy of his predecessors in giving his personal inspection and counsel to every part of the States aided. He has, moreover, accomplished great and lasting results by his eloquent and pointed addresses before the Legislatures of most of the States participating in the fund.

The disbursements from the John F. Slater fund amounted in 1883 to $16,250, and in 1884 to $17,107. This fund consists of $1,000,000, conveyed in 1882 by Mr. Slater to several gentlemen in trust for the education of the freedmen of the South. The general agent, Dr. A. G. Haywood, spent nearly a year in personal examination of the conditions bearing upon this particular branch of educational work in the South, and presented to the trustees a detailed report based upon the same. After this report had been fully considered the following resolution was adopted as to the plan of operations:

"*Resolved*, That for the present this board confine its aid to such schools as are best fitted to prepare young colored men and women to become useful to their race; and that institutions which give instruction in trades and other manual occupations that will enable colored youths to make a living and to become useful citizens be carefully sought out and preferred in appropriations from this fund; and that, so far as practicable, the scholars receiving aid from this foundation shall be trained to some manual occupation simultaneously with their mental and moral instruction; and that, to initiate the policy set forth in this resolution, the sum of $20,000 be

appropriated, and spent under the direction of the general agent during the year 1883."

The distribution of the fund has been made in accordance with this plan, which greatly extends the industrial training of the colored youth of the South. Out of twenty-three institutions aided, nineteen applied the whole or a portion of the amount received by them to establishing or improving industrial departments.

A summary of statistics of public schools in 266 cities presents the following totals: Total population (census of 1880), 10,790,034; school population, 2,894,836; number of school buildings, 3955; number of sittings for study, 1,059,729; number of teachers, 33,037; number of pupils enrolled, 1,857,435; average daily attendance, 1,218,655; estimated enrolment in private schools, 376,583; estimated cash value of taxable property in the cities, $8,220,541,893; estimated real value of school property, $98,851,064; total receipts for school purposes, $32,461,172; total expenditure, $30,008,015. The average expense per capita of daily average attendance for instruction and supervision ranges from $10.86 in Ironton, Ohio, to $24.82 in Newton, Mass.; for incidental expenses, from 84 cents in Warwick, R. I., to $13.37 in Newton, Mass.

The tax for school purposes on assessed valuation ranges from .95 of a mill to 25 mills per dollar of assessed valuation. It is 10 mills or more in 31 cities, and 4 mills or less in 81.

From an examination of the statistics of 213 cities that report both school population and average daily attendance, it appears that the average daily attendance (1,066,357) is very nearly 40 per cent of the corresponding school population (2,797,818). But this population, it must be remembered, greatly exceeds the number of youth whose attendance might reasonably be expected. The legal school period in the cities tabulated ranges from 10 to 17 years, whereas from 6 to 8 years is in all countries the recognized duration of the school period.

The commissioner calls attention to the importance of overcoming the deficiency of school accommodation existing in many cities, to the favorable operations of the truant service in several cities, and to the special provision made in various cities for the instruction of children whose attendance upon school is necessarily irregular.

With reference to the higher grades of schools it is noticeable that the majority of the scholars who enter the grammar or intermediate schools do not get beyond the middle of the course; hence it becomes necessary to arrange the studies with reference to that fact.

So far as reported to the office the cities in which provision for manual training has been made in connection with the public schools, or under the auspices of the public-school boards, are Boston, New Haven, Philadelphia, Baltimore, Cleveland, Toledo, Chicago, Moline, and Peru.

"In view," says the commissioner, "of the general demand for industrial training and of the abundant and authoritative testimony as to the value of drawing in this relation, it is surprising that so large a proportion of our cities still fail to make provision for this branch of instruction."

The full text of the report of a special committee appointed to investigate the subject of "recess versus no recess" is given. The conclusions of the committee are not favorable to the abolition of the recess.

The 255 *normal schools* reporting had 1937 instructors and 60,063 students. Of the whole number 127 are public normal schools, having 1147 instructors and 34,757 students, the number of normal students being 22,710. The private normal schools number 128, with 790 instructors and 25,306 students, of whom 15,644 are normal students. Of the public normal schools, 103 are supported by State, 2 by county, and 22 by city appropriations. Few cities maintain normal schools, and the amount of money expended by the cities in this work is small as compared with other expenditures for education. State normal schools, established either as separate institutions or as departments of universities or colleges, are reported from all the States save Delaware, Louisiana, Nevada, Ohio, and South Carolina.

The multiplication of normal schools in the Southern States is an important fact in the recent history of popular education in our country. In 1867 the Richmond Normal School, Richmond, Va., and the State Normal School (Marshall College), Huntington, W. Va., were established. These were the earliest normal schools, organized as such, in the States that have received the benefit of the Peabody fund. Now 35

public normal schools are reported from these States, with appropriations from public funds amounting for the year, so far as reported to this office, to $212,228.

Attention is called to the work of universities and colleges in respect to training in pedagogics. Chairs of pedagogics or didactics have been established in the Universities of Michigan, Missouri, Iowa, Nebraska, and Wisconsin. Johns Hopkins University has in various ways made its influence felt upon the teaching profession, and its work in this direction promises to be greatly extended through the lectureship of psychology, which has been accepted by G. Stanley Hall, Ph.D.

In this connection copious extracts are made from addresses delivered before the International Conference on Education, held under the auspices of the Health Exhibition in London, in 1884.

The *business colleges* reporting number 221, having 1015 instructors and 44,074 students. Improvement is noted in these schools in respect to appliances, methods, and results of instruction.

There are 354 *Kindergartens* reported, with 831 instructors and 17,002 pupils. Excepting the year 1877, there has been a steady increase in the number of Kindergartens, Kindergarten instructors, and pupils from year to year during the decade. This increase is mainly due to the efforts of associations formed in several of our large cities for the purpose of establishing these infant schools for the benefit of the poor. Interesting details are given of the philanthropic work as carried on in Boston, New York, Philadelphia, Chicago, and San Francisco.

Some progress has been made in Milwaukee and San Francisco in incorporating the Kindergarten with the public-school system. In St. Louis, where such a result was hoped for, an obstacle has arisen in the school law, which fixes the lowest limit of the school age at 6 years. The Kindergarten exhibit, as noted in the report, formed a very important feature of the educational exposition made at Madison, Wis., in connection with the annual meeting of the National Educational Association.

Secondary Instruction.—The total number of pupils in all classes of institutions reporting under this head is 271,215.

Of this number 34,672 are reported in city high schools, 152,354 in institutions for secondary instruction, and 18,319 in preparatory schools. The remainder are in institutions that do not make this grade of instruction their sole purpose—viz.: Normal schools, 21,429; preparatory departments of superior institutions for women, 9268; of universities and colleges, 32,755; of schools of science, 2418.

The number of pupils reported as preparing for college (classical or scientific course) in the several classes of schools specified is 36,333.

With reference to the general condition of secondary instruction in the Union, the commissioner says:

"It is evident that so far as secondary schools are feeders for higher institutions, whether classical or scientific, their studies and standards must be regulated by this relation. This fact is sufficiently recognized among us, and the persons whose business it is to see that the secondary and superior institutions are properly co-ordinated seem to be fully alive to the present necessities of the case. Several measures have been recently adopted for the furtherance of this end. Among these are the policy of admitting to certain colleges and State universities graduates of accredited high schools and academies without examination and the agreement on the part of a number of Eastern colleges as to admission requirements and a common standard of examination."

Superior Instruction.—From a table drawn from the census of 1880 showing the number of persons, native and foreign, in the United States whose pursuits necessitate appropriate superior or special knowledge and training, it appears that 4,870,109 persons, or about 9 per cent of the population, have a direct interest in the facilities offered by our colleges, schools of science, and professional schools.

For the *superior instruction of women* there are reported 236 institutions, having 2989 instructors and 30,587 students. Five colleges for women in New York State which, on account of their relation to the University of New York, are included in Table IX., report 894 students; co-education universities or colleges, Table IX., report in preparatory departments 8161 female students, in classical courses 2009, and in scientific courses 1196; co-education colleges and schools of science, Table X., report in preparatory departments 460 female

students—making the total number of women reported in institutions for superior instruction 43,307, as against 40,407 reported in 1882–83. Of the whole number, 18,196 are reported in preparatory departments and 19,916 in collegiate, special, and graduate courses, the classification of the remainder not being specified. No statement is given of the number of female students in the schools of science in other departments than the preparatory.

Provision for the higher education of women in foreign countries is treated quite fully, the most important items under this head being the admission of women to McGill University, Montreal, and to University College at Toronto. In concluding this subject the commissioner says :

" The array of facts which meets us thus from year to year with reference to new provision for the higher education of women or the good results from existing provision is sufficient proof of the inestimable value of these provisions to the individual women who have or may enjoy them and of large benefits ensuing therefrom to society in general."

Under the head of *universities and colleges* 370 institutions are reported. Of these, 19 report only preparatory departments and 8 do not give the number of students, leaving 343 whose work is very clearly exhibited. Among these are distributed 32,767 collegiate students. An examination of the country by geographical sections ranged around the centre of population as located by the census of 1880—viz. : latitude 39° 4′ 8″ N. and longitude 84° 39′ 40″ W. of Greenwich, shows that in the north-east section, embracing Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Delaware, Maryland, Pennsylvania, District of Columbia, Ohio, and Michigan, the ratio of college students to population is highest—viz. : 1 to every 1346 of the people.

From a detailed statement of the status of our colleges and universities with respect to students, funds, etc., it appears that, of 75 institutions having from 100 to 200 students, 12 report productive funds ranging from $50,000 to $100,000, 23 report from $100,000 to $500,000, and 4 report above $500,000. Of the entire number, 62 have each 8 or more professors.

Of 19 institutions having from 200 to 300 students, 2 report productive funds less than $50,000, 2 report from $50,000 to

$100,000, 4 report from $100,000 to $300,000, 3 report from $300,000 to $500,000, 3 report from $500,000 to $1,000,000, and 2 report above $1,000,000.

Seventeen of these institutions have each 10 or more professors.

Of 15 institutions having 300 or more students, 4 make no report of productive funds, 1 reports none, 3 report from $250,000 to $500,000, 3 report from $500,000 to $1,000,000, and 4 report above $1,000,000.

The last group of institutions report faculties varying in number from 18 to 58. Altogether 21 universities or colleges are enumerated whose productive funds exceed $500,000, with 6 others having annual State appropriations equal to or exceeding the income of $500,000 at 6 per cent.

Statements with respect to the finances of foreign universities are given and suggest interesting comparisons.

Under the head of *schools of science* 92 institutions are reported, having 1178 instructors and 14,769 students. Of the whole number 47 are endowed with the national land grant of 1862. These report 619 instructors in all departments and 6157 students. "We have reason," says the commissioner, "to be gratified with our record in respect to scientific and technical instruction. The completeness with which certain of the schools have been equipped and the wisdom manifested in their adaptation to special conditions indicate that we have had in our midst men well qualified to direct this new development in education."

In this connection the report presents the favorable comments of a number of foreign authorities who have personally examined the subject. The commissioner does not, however, ignore the fact that there is room for great improvement, especially in respect to the majority of the schools endowed with the national land grant.

The number of *schools of theology* reported is 146, having 750 instructors and 5290 students. Their property valuation is $6,357,796; productive funds equal $9,790,131; income from same, $586,856.

The number of *schools of law* reporting is 47, with 269 instructors and 2686 students. Their property valuation is $40,000; productive funds, $325,400; income from same, $23,205; receipts from tuition fees in 1884, $132,705.

The commissioner says:

"Comparing the number of clergymen and of lawyers in 1880 (64,698 to 64,137) with the annual attendance on divinity schools and on law schools for a series of years, it is very obvious that the lawyers of the Union do not obtain their professional training, or the theoretical part thereof, from their professional schools to any such extent as do clergymen from schools of theology.

"It is to be remembered further that nearly all the religious denominations now favor a preliminary collegiate education for their clergy, and that the course of theological study in most schools is three years in duration; the law schools usually require but two years of study before graduation, and most of them do not require advanced preparatory training."

Of *schools of medicine, dentistry, and pharmacy*, 145 are reported, having 2235 instructors and 15,300 students. Their property valuation is $3,495,200; productive funds, $622,139; income from same, $21,179; receipts from tuition fees for 1884, $725,921.

In 1883 the number of degrees of all classes conferred in course was 10,801; honorary, 511. These were distributed as follows: In letters, 3587 in course, 155 honorary; in science, 1179 in course, 13 honorary; in philosophy, 327 in course, 38 honorary; in art, 41 in course, 2 honorary; in theology, 372 in course, 203 honorary; in medicine, 4308 in course, 6 honorary; in law, 915 in course, 94 honorary.

Libraries.—The following is the aggregate for the libraries now reported:

Total number of public libraries reported, each having 300 volumes or upward	4,503
Total number of volumes	13,668,855
Total yearly additions (2,133 libraries reporting)	596,608
Total yearly use of books (1,088 libraries reporting)	10,899,469
Total amount of permanent fund (1,905 libraries reporting)	$7,014,009
Total amount of yearly income (1,247 libraries reporting)	1,592,602
Total yearly expenditures for books, periodicals, and binding (1,212 libraries reporting)	697,169
Total yearly expenditure for salaries and incidental expenses (1,039 libraries reporting)	857,747

The Bureau has now in progress a work on libraries that is intended to supplement the special report published in 1876. Some topics not treated in that publication will be presented and the subjects therein considered will be brought down to date.

Thirty-one *training schools for nurses* report 156 instructors, 579 pupils, 221 graduates in 1884, 1855 pupils since organization, and a total of 1009 graduates.

Schools for Deaf-Mutes, Blind, Feeble-Minded, etc.—No material change has taken place in any of these since 1882–83. In Table XVIII. (institutions for the deaf and dumb) 2 additional schools are reported, all having under instruction 22,515 pupils, as against 22,991 in 1882–83. State appropriations for the current year amount to $1,551,727, an increase of $288,554. Expenditures for the year amount to $1,595,191, an increase of $151,805. In Table XIX. (schools for the blind) 1 additional school is reported. The number of pupils is 2319, an increase of 65. State or municipal appropriations for the year amount to $647,041, an increase of $66,657; total receipts, to $913,722, an increase of $57,110; expenditures, to $599,285, a decrease of $78,350.

In Table XX. (schools for feeble-minded youth) 2 new schools are reported—viz.: the California Association for the Care and Training of Feeble-Minded Children, and Family Home School for Nervous and Delicate Children, Amherst, Mass. The total number of inmates in all these schools has increased since 1882–83 from 2434 to 2505; income, from $408,953 to $575,212, and expenditures, from $450,900 to $570,948.

Reform schools (Table XXI.) are reported from 22 of the 38 States of the Union and the District of Columbia; in all, 62 schools are included. The total annual cost (3 schools not reporting) amounted to $2,010,237, and the total earnings (7 schools not reporting) to $387,514.

Table XXII. presents the statistics of 505 homes and asylums for orphan or dependent children, infant asylums, and industrial schools. The total number of present inmates is 65,311; total income, $5,725,142; total expenditure, $5,113,574.

Benefactions.—The total of donations and legacies by indi-

viduals in aid of education, so far as reported to this office, amounted, during 18 months—viz. : from January 1st, 1883, to July 1st, 1884, to $11,270,236. Benefactions amounting to one or more millions of dollars are reported from Massachusetts, New York, and Maryland. As usual, universities and colleges secure the largest proportion of these gifts. Schools of theology come next. Preparatory schools and institutions for secondary instruction together received $1,210,006.

SCHOOL HYGIENE.

The commissioner calls especial attention to a paper about to be published by the Bureau containing a *résumé* of information on the subject of school hygiene. This paper will recite briefly the early attempts made in this country in the direction of school hygiene, as far as ventilation is concerned. The importance of a chemical examination of room air as ancillary to ventilation will then be pointed out, the method at present employed to make such examination, together with the standard or limit of impurity for school-room air, will be explained, and the inadequacy of the unaided senses for this purpose will be shown. A table of the results obtained in examining some school-rooms in Washington, D. C., by the method previously explained, and the formulas employed for computing the amount of ventilation from the figures so obtained, will be given.

The report gives an account of the preliminary measures respecting the educational division of the exposition at New Orleans. The hopes expressed by the commissioner at the outset as to the character and effects of the contemplated exhibit have been, as we know at this date, abundantly realized, a result due in large measure to the zeal and experience which he brought to the management of the difficult undertaking.

WHO IS THE LABORER?—The man who works ten hours a day with his hands, or the man who works sixteen with his brain? There is a great gush of sentiment just now for the manual laborer, as though he who toiled with his hands is more of a slave than he who earns his bread by the sweat of his brain. Thought rules the world. Thought built the engines that

consume the coal that runs hundreds of millions of wheels. It is thought that created the unnumbered wants of civilization. Thought is the greatest of all laborers, and yet in the organizations of the Knights of Labor no inventor, or editor, or logician, or orator, or statesman would be admitted—no man who does not toil with his hands to earn his daily bread. Who is more of a day laborer than the teacher? Who deserves higher recognition, or more just treatment? Who moulds thought or shapes the destinies of the world more than he? What are car-drivers compared with pedagogues, or engineers compared with school-masters? From the teacher's brain come the materials for work, all fashioned and moulded for effective action. But notwithstanding all this, who ever heard of a "teachers' strike," or a secret organization named "The Knights of the Spelling-Book"? It would surpass the wildest dream of the poet's imagination to suppose that any considerable number of teachers had banded together in a compact so strong as to stop teaching at the instant when ordered by a superior officer, only to resume as quickly when the order was given. Why is such an organization so utterly inconceivable? Simply because teachers are too intelligent to be so led. Brain-workers will never organize for a strike. They have organized, but it is for the purpose of finding out how they can increase the quality of their work. Its quantity can neither be augmented nor over-estimated. There are thousands of wrongs they bear rather than fly to those they know not of, for they know that the one disease at the root of all the ills of their lives will be cured when men come to appreciate the thought producing power of the world. The land without the school-master is the land without work.—*The School Journal.*

LACTOPEPTINE.—We have used this article for some time in cases of indigestion, and can recommend it as a valuable remedy. Containing the firm active agents which are concerned in the process of digestion, it cannot fail to aid the system in preparing the food for assimilation. It is an invaluable remedy in the Summer Diarrhœa of children. Owing to its great impairment of the vital forces and feeble powers of the digestion tract, food frequently irritates and increases the difficulty. For such cases we learn of no agent in the Materia Medica as reliable as *Lactopeptine.—Cal. Med. Journal.*

INTERNATIONAL MEDICAL CONGRESS.

THE NINTH INTERNATIONAL MEDICAL CONGRESS WILL ASSEMBLE IN THE CITY OF WASHINGTON, THE CAPITAL OF THE UNITED STATES, ON MONDAY, SEPTEMBER 5th, 1887.

Circular No. 2.

Patrons.—The President of the United States, the Hon. Grover Cleveland; the Secretary of State, the Hon. Thomas F. Bayard; the President of the Senate of the United States, the Hon. John Sherman; the Speaker of the House of Representatives of the United States, the Hon. John G. Carlisle.

PROPOSED OFFICERS OF THE CONGRESS.

President.—Nathan S. Davis, M.D., LL.D., Professor of the Principles and Practice of Medicine and of Clinical Medicine, Chicago Medical College, and of Mercy Hospital, Chicago, Ill.

Vice-Presidents, as far as appointed.—McCall Anderson, M.D., London, England; Mr. Thomas Annandale, Professor of Clinical Surgery, Edinburgh University, Edinburgh, Scotland; Professor Dujardin-Beaumetz, M.D., Paris, France; Cuthbert Hilton Golding Bird, M.D., Professor of Physiology, Guy's Hospital, London, England; Professor Carl Braun, M.D., Vienna, Austria; William Brodie, M.D., Emeritus Professor of Principles and Practice of Medicine and Clinical Medicine, Detroit College of Medicine, Detroit, Mich.; W. W. Dawson, M.D., Professor of Surgery and Clinical Surgery, Medical College of Ohio, Cincinnati, Ohio; Thomas M. Dolan, M.D., Halifax, England; F. R. Frazer, M.D., Professor of Materia Medica and Therapeutics, University of Edinburgh, Edinburgh, Scotland; J. A. Grant, M.D., Ottawa, Canada; J. A. S. Grant, M.D., Cairo, Egypt; A. L. S. Gusseraw, M.D., Professor of Obstetrics, Berlin, Prussia;

Dr. Hans Ritter von Hebra, Vienna, Austria; Dr. E. Klein, London, England; Mons. Le Baron H. Larrey, Paris, France; Sir William MacCormac, Surgeon St. Thomas' Hospital, London, England; Mr. George B. Macleod, Professor of Surgery, Glasgow, Scotland; John S. McGrew, M.D., Honolulu, Hawaiian Islands; E. M. Moore, M.D., LL.D., Rochester, N. Y.; Professor Von Monseil, Bonn, Prussia; Dr. Müller, Berlin, Prussia; William Murrell, M.D., London, England; Charles D. F. Phillips, M.D., M.R.C.S., late Lecturer on Materia Medica and Therapeutics, Westminster Hospital, London, England; Richard Quain, M.D., Professor of Anatomy, London, England; Tobias G. Richardson, M.D., Professor of General and Clinical Surgery, Medical Department, Tulane University, New Orleans, La.; Mons. P. Ricord, Paris, France; Professor John Burdon Sanderson, M.D., London, England; Lewis A. Sayre, M.D., Professor of Orthopædic and Clinical Surgery, Bellevue Hospital Medical College, N. Y.; Dr. Mariano Semmola, Professor of Experimental Therapeutics, University of Naples, Italy; Dr. Leopold Servais, Antwerp, Belgium; J. M. Toner, M.D., Washington, D. C.; Dr. P. G. Unna, Hamburg, Germany; Professor F. Winckel, Dresden, Saxony; the President of the American Medical Association; the Surgeon-General of the United States Army; the Surgeon-General of the United States Navy.

Secretary-General.—John B. Hamilton, M.D., Supervising Surgeon-General of the United States Marine Hospital Service; Professor of Surgery, Georgetown University, D. C.; Professor of Surgery, Chicago Polyclinic.

Treasurer.—E. S. F. Arnold, M.D., M.R.C.S., Newport, R. I.

Chairman of the Finance Committee.—Richard J. Dunglison, M.D., Philadelphia, Penn.

Chairman of the Executive Committee.—Henry H. Smith, M.D., LL.D., Emeritus Professor of Surgery in the University of Pennsylvania, Philadelphia, Penn.

Chairman of the Committee of Arrangements.—A. Y. P. Garnett, M.D., Emeritus Professor of Clinical Medicine, Columbia University, Washington, D. C.

Associate Secretaries of the Congress.—William B. Atkinson,

M.D., Philadelphia, Penn. ; G. B. Harrison, M.D., Washington, D. C.

The Congress will consist of such members of the regular medical profession as shall have registered and taken out their ticket of admission, and of such other scientific men as the Executive Committee of the Congress shall deem it desirable to admit. The books for the registration of members will be open from 9 A.M. to 5 P.M., on Thursday, September 1st, 1887, and on each subsequent day during the session, under the charge of the *"Reception Committee."* Any member desiring to anticipate this registration can apply by letter to the Secretary-General and forward his dues, with his address in full, when a receipt will be returned.

The dues of membership for residents of the United States will be ten dollars ($10). There will be no dues for members residing in other countries. Each member will be entitled to receive a copy of the "Transactions" of the Congress, when published by the Executive Committee.

The general sessions of the Congress will be devoted to the transaction of business and addresses and communications of general scientific interest, by members appointed by the Executive Committee. A printed "Programme" of the sessions will be presented to each member on registering. A printed "Order of Business" for each day will also be issued.

The work of the various sections will be directed by the president of the section, and the order will be published in a daily programme for each section. Questions and topics that have been agreed on for discussion in the sections shall be introduced by members previously designated by the titular officers of each section. Members who shall have been appointed to open discussions shall present to the secretaries of the section, in advance, statements of the conclusions which they have formed as a basis for the debate.

Brief abstracts of papers to be read in the sections shall be forwarded to the secretaries of the proper section on or before *April 30th*, 1887. These abstracts shall be treated as confidential communications, and shall not be published before the meeting of the Congress. Papers relating to topics not included in the list of subjects proposed by the officers of the sections may be accepted after April 30th, 1887, and any

member wishing to introduce a topic not on the regular lists of subjects for discussion shall give notice of the same to the Secretary-General, at least twenty-one days before the opening of the Congress. The titular officers of each section shall decide as to the acceptance of such proposed communications, and the time for their presentation. No communication shall be received which has been already published or read before a society.

The official languages of the Congress shall be English, French, and German. Each paper or address shall be printed in the "Transactions" in the language in which it was presented. Preliminary abstracts of papers and addresses shall also be printed in the language in which each is to be delivered. All discussions shall be printed in English.

The officers of the Congress and the officers of the sections, including all foreign officers, will be nominated to the Congress by the Executive Committee, at the opening of the first session. A partial list of the officers to be nominated (except the members of council of the different sections, the list of whom is at present imperfect) is offered herewith.

The Executive Committee cordially invites members of the regular medical profession, and men eminent in the sciences collateral to medicine, in all countries, to participate, in person or by papers, in the work of this great humanitarian assembly. Communications relating to appointments for papers to be read in the Congress should be addressed to Dr. John B. Hamilton, Secretary-General of the Ninth International Medical Congress, Washington, D. C. All questions or communications connected with the business of the Executive Committee should be addressed to Dr. Henry H. Smith, Chairman of the Executive Committee of the Ninth International Medical Congress, Philadelphia, Penn. Gentlemen named in any position in the Congress are requested to notify the chairman of the Executive Committee, as soon as practicable, of any error in the name, title, or address in this circular.

Ladies in attendance with members of the Congress, and those invited by the "Reception Committee," may attend the general sessions of the Congress when introduced by a member. They will also be invited to attend the social receptions. The Executive Committee reserves the right to

invite distinguished persons to any or all the meetings of the Congress. The attendance of medical students and others interested in the work of the various sections or in the general addresses delivered in the Congress will be permitted, on the recommendation of the Secretary-General or the officers of a section, on their taking out from the Registration Committee a general ticket of admission, fee one dollar ($1); but such persons cannot take part in the proceedings.

All communications and questions relating to the special business of any section must be addressed to the President or one of the secretaries of that section. As many details of the Congress and numerous appointments of officers are yet to be completed, other circulars will be issued from time to time, as circumstances may demand.

The following is the list as at present completed:

EXECUTIVE COMMITTEE OF THE CONGRESS.

Henry H. Smith, M.D., LL.D., *Chairman;* N. S. Davis, M.D., LL.D.; John B. Hamilton, M.D.; E. S. F. Arnold, M.D.; Richard J. Dunglison, M.D., *Secretary;* Abram B. Arnold, M.D.; William T. Briggs, M.D.; DeLaskie Miller, M.D., Ph.D.; James F. Harrison, M.D.; F. H. Terrill, M.D.; William H. Pancoast, M.D.; John H. Callender, M.D.; Alonzo B. Palmer, M.D., LL.D.; J. Lewis Smith, M.D.; E. Williams, M.D.; S. J. Jones, M.D., LL.D.; William H. Daly, M.D.; A. R. Robinson, M.D.; Joseph Jones, M.D.; Albert L. Gihon, M.D.; John P. Gray, M.D., LL.D.; Jonathan Taft, M.D.; Frederick S. Dennis, M.D.; A. Y. P. Garnett, M.D.

PRESIDENTS OF SECTIONS.

General Medicine.—Abram B. Arnold, M.D., Professor of Clinical Medicine, College of Physicians and Surgeons, Baltimore, Md.

General Surgery.—William T. Briggs, M.D., Professor of Surgery, University of Nashville, Nashville, Tenn.

Military and Naval Surgery and Medicine.—Henry H. Smith, M.D., LL.D., Emeritus Professor of Surgery, University of Pennsylvania, and formerly Surgeon-General of Pennsylvania, Philadelphia, Pa.

Obstetrics.—DeLaskie Miller, M.D., Ph.D., Professor of Obstetrics, Rush Medical College, Chicago, Ill.

Gynæcology.—James F. Harrison, M.D., Professor of Obstetrics, etc., University of Virginia, Va.

Therapeutics and Materia Medica.—F. H. Terrill, M.D., Professor of Therapeutics, University of California, San Francisco, Cal.

Anatomy.—William H. Pancoast, M.D., Professor of General, Descriptive, and Surgical Anatomy, Medico-Chirurgical College, Philadelphia, Pa.

Physiology.—John H. Callender, M.D., Professor of Physiology and Psychology, University of Nashville, Nashville, Tenn.

Pathology.—Alonzo B. Palmer, M.D., LL.D., Professor of Pathology, University of Michigan, Ann Arbor, Mich.

Diseases of Children.—J. Lewis Smith, M.D., Professor of the Diseases of Children, Bellevue Hospital Medical College, New York, N. Y.

Ophthalmology.—E. Williams, M.D., Professor of Ophthalmology, Miami Medical College, Cincinnati, Ohio.

Otology.—S. J. Jones, M.D., LL.D., Professor of Ophthalmology and Otology, Chicago Medical College, Chicago, Ill.

Laryngology.—William H. Daly, M.D., Pittsburg, Pa.

Dermatology and Syphilis.—A. R. Robinson, M.D., Professor of Dermatology, New York Polyclinic, and of Histology and Pathological Anatomy, Woman's Medical College of the New York Infirmary, New York, N. Y.

Public and International Hygiene.—Joseph Jones, M.D., Professor of Chemistry and Clinical Medicine, Tulane University; ex-President Board of Health, New Orleans, La.

Medical Climatology and Demography.—Albert L. Gihon, M.D., Medical Director U. S. Navy.

Psychological Medicine and Nervous Diseases.—John P. Gray, M.D., LL.D., Professor of Psychological Medicine and Medical Jurisprudence, Bellevue Hospital Medical College, Utica, N. Y.

Dental and Oral Surgery.—Jonathan Taft, M.D., Professor of Dental and Oral Surgery, University of Michigan, Ann Arbor, Mich., Cincinnati, Ohio.

VICE-PRESIDENTS OF SECTIONS.

General Medicine.—W. W. Cleaver, M.D., Kentucky; J. A. Octerloney, M.D., Kentucky; P. G. Robinson, M.D., Missouri; Thomas F. Rochester, M.D., New York; Preston B. Scott, M.D., Kentucky.

General Surgery.—Professor Filanus, Holland; Moses Gunn, M.D., Illinois; J. W. Hamilton, M.D., Ohio; W. H. Hingston, M.D., Canada; James M. Holloway, M.D., Kentucky; J. C. Hutchison, M.D., New York; N. S. Lincoln, M.D., District of Columbia; Donald MacLean, M.D., Michigan; Donald Macrea, M.D., Iowa; M. Storrs, M.D., Connecticut.

Military and Naval Surgery and Medicine.—C. J. Cleborne, M.D., United States Navy; E. H. Gregory, M.D., Missouri; Frank H. Hamilton, M.D., New York; W. T. Hord, M.D., United States Navy; Frederick Hyde, M.D., New York; G. L. Porter, M.D., Connecticut; William E. Taylor, M.D., United States Navy; Edward Warren-Bey, M.D., France; B. A. Watson, M.D., New Jersey.

Obstetrics.—Gustav Braun, M.D., Austria; P. Budia, M.D., France; J. Galabin, M.D., England; John Goodman, M.D., Kentucky; W. M. Knapp, M.D., Nebraska; R. Lowry Sibbet, M.D., Pennsylvania; Isaac E. Taylor, M.D., New York.

Gynæcology.—N. Bozeman, M.D., New York; Henry O. Marcy, M.D., Massachusetts; T. A. Reamy, M.D., Ohio; H. R. Storer, M.D., Rhode Island.

Therapeutics and Materia Medica.—Henry M. Field, M.D., New Hampshire; Albert Frické, M.D., Pennsylvania; George Gray, M.D., Ireland.

Anatomy.—C. W. Kelly, M.D., Kentucky; Samuel Logan, M.D., Louisiana.

Physiology.—

Pathology.—Andrew Fleming, M.D., Pennsylvania; J. B. Johnson, M.D., Missouri; Henry F. Lyster, M.D., Michigan.

Diseases of Children.—William B. Atkinson, M.D., Pennsylvania; William G. Booker, M.D., Maryland; William H. Day, M.D., England; Dr. Cadet de Gassicourt, France; Dr. J. Grancher, France; Dr. Edward Henoch, Prussia;

Adoniram B. Judson, M.D., New York; J. P. Oliver, M.D., Massachusetts; Eustace Smith, M.D., England; Charles West, M.D., England; Joseph E. Winters, M.D., New York.

Ophthalmology.—A. W. Calhoun, M.D., Georgia; J. J. Chisholm, M.D., Maryland; P. D. Keyser, M.D., Pennsylvania; Dudley S. Reynolds, M.D., Kentucky.

Laryngology.—M. F. Coomes, M.D., Kentucky; J. H. Hartman, M.D., Maryland; J. O. Roe, M.D., New York; E. L. Shurley, M.D. Michigan; G. V. Woolen, M.D., Ind.

Dermatology and Syphilis.—James M. Keller, M.D., Arkansas; John V. Shoemaker, M.D., Pennsylvania; George Thin, M.D., London, England.

Public and International Hygiene.—A. Nelson Bell, M.D., New York; John Berrien Lindsley, M.D., Tennessee; J. N. McCormack, M.D., Kentucky; J. F. Y. Paine, M.D., Galveston, Tex.; Benjamin W. Richardson, M.D., England; John Simon, M.D., England; J. W. Thudicum, M.D., Eng.

Medical Climatology and Demography.—Dr. A. Chervin, Paris, France; Traill Green, M.D., Pennsylvania; John H. Hollister, M.D., Illinois.

Psychological Medicine.—Julius Althaus, M.D., England; R. H. Chase, M.D., Pennsylvania; Eugene Grissom, M.D., North Carolina; John C. Hall, M.D., Pennsylvania; P. A. Hooper, M.D., Arkansas; J. S. Jewell, M.D., Illinois; S. S. Schultz, M.D., Pennsylvania.

Dental and Oral Surgery.—W. W. Allport, M.D., Illinois; S. W. Dennis, M.D., California; C. L. Ford, M.D., Michigan; H. L. McKellops, M.D., Missouri; A. T. Metcalf, M.D., Michigan; W. H. Morgan, M.D., Tennessee; A. L. Northrop, M.D., New York; L. D. Shepard, M.D., Mass.

SECRETARIES.

General Medicine.—J. W. Chambers, M.D., Baltimore, Md.

General Surgery.—Dudley P. Allen, M.D., Cleveland, Ohio; Carl Mayde, M.D., Germany; J. R. Weist, M.D., Richmond, Ind.; A. H. Wilson, M.D., South Boston, Mass.

Military and Naval Surgery and Medicine.—J. McF. Gaston, M.D., Atlanta, Ga.; E. A. Wood, M.D., Pittsburg, Pa.

Obstetrics.—A. Charpentier, M.D., Paris, France; T. Felsenreich, M.D., Vienna, Austria; W. W. Jaggard, M.D., Chicago, Ill.; John Williams, M.D., London, England.

Gynæcology.—Ernest W. Cushing, M.D., Boston, Mass.
Therapeutics.—Frank Woodbury, M.D., Philadelphia, Pa.
Anatomy.—Henry Morris, M.D., Philadelphia, Pa.
Physiology.—R. W. Bishop, M.D., Chicago, Ill.
Pathology.—H. M. Biggs, M.D., New York, N. Y.; I. N. Himes, M.D., Cleveland, Ohio.
Diseases of Children.—Dillon Brown, M.D., New York.
Ophthalmology.—S. C. Ayres, M.D., Cincinnati, Ohio.
Otology.—S. O. Richey, M.D., Washington, D. C.
Laryngology.—William Porter, M.D., St. Louis, Mo.
Dermatology.—W. T. Corlett, M.D., Cleveland, Ohio; F. E. Daniel, M.D., Austin, Tex.
Public and International Hygiene.—George H. Rohé, M.D., Baltimore, Md.; Walter Wyman, M.D., U. S. Marine Hospital Service, New York, N. Y.
Climatology and Demography.—Charles Denison, M.D., Denver, Col.; James F. Todd, M.D., Chicago, Ill.
Psychological Medicine.—E. D. Ferguson, M.D., Troy, N. Y.; E. Landolt, M.D. (Berlin, Prussia), Paris, France.
Dental and Oral Surgery.—Edward A. Bogue, M.D., New York, N. Y.; S. F. Rehwinkle, M.D., Chillicothe, Ohio.

COMMITTEE OF ARRANGEMENTS, WASHINGTON, D. C.

A. Y. P. Garnett, M.D., *Chairman;* J. M. Toner, M.D., *Vice-Chairman;* C. H. A. Kleinschmidt, M.D., *Secretary;* D. C. Patterson, M.D., *Treasurer.*

Executive Committee.—Drs. A. Y. P. Garnett, J. M. Toner, N. S. Lincoln, C. H. A. Kleinschmidt, Surgeon-General F. M. Gunnell, M.D., U. S. Navy; Surgeon-General Robert Murray, M.D., U. S. Army; Supervising Surgeon-General J. B. Hamilton, M.D., U. S. Marine Hospital Service; Chief Medical Purveyor J. H. Baxter, M.D., U. S. Army.

Committee on Congressional Legislation.—Dr. A. Y. P. Garnett, *Chairman.*

Committee on Finance.—Dr. G. L. Magruder, *Chairman.*

Committee on Printing.—Dr. J. B. Hamilton, *Chairman.*

Committee on Reception.—Dr. J. M. Toner, *Chairman.*

Committee on Entertainments.—Dr. N. S. Lincoln, *Chairman.*

Committee on Transportation.—Dr. J. W. H. Lovejoy, *Chairman.*

Committee on Place of Meeting for Congress and Sections.—Dr. D. C. Patterson, *Chairman.*

By order of the Executive Committee of the Congress.

HENRY H. SMITH, M.D., *Chairman.*

RICHARD J. DUNGLISON, M.D., *Secretary.*

STATISTICS OF SEWAGE-FARMS.

A FEW useful figures are given in the work of Mr. Lewis D'A. Jackson, lately published, respecting the systems of irrigations that have been put into operation in England. A general tabular statement of the nine sewage-farms competing in 1879 based on the judges' report affords much useful information. We here furnish a few data. The number of acres irrigated at Aldershot is ninety-nine, which takes the supply of sewage from 8000 persons, or, at the rate of seventy-seven persons to an acre. The average daily supply was, then, 28,000 cubic feet. There is no lift. The land irrigated is of a light sandy character, and the subsoil is ferruginous gravel. One of the chief disadvantages is the want of storm outlets. The whole of the sewage from the Camp passes on to the farm, the effluent is said to be clear, bright and inoffensive. The treatment adopted consists in collecting the sewage in subsidence tanks of small size on the farm, from which the liquid matter alone is allowed to flow direct on to the land. The sludge tanks are formed of earthen banks coated with gravel and tar, and these receive the solid matter at a lower level. Their dimensions are one hundred and eleven feet by twenty-one feet by two-and-one-half feet. The sludge is allowed to consolidate in them, and at certain seasons is carted on to the land—the liquid runs in earth carriers, the land being divided into two-acre plots, subdivided by subsidiary carriers.

Parts of the land are drained to a depth of four feet to six feet; the drains being thirty to sixty feet apart. More drains are considered to be necessary, especially during floods. Crops of all kinds have been successfully grown on the farm. Bedford has an irrigated area of one hundred and fifty-three acres, and the sewage represents 18,690 persons, or one hundred and two persons per acre. The average daily supply of sewage is 152,000 cubic feet; it is lifted twenty-one feet and thirteen feet. The soil is light sand and loam, but the local disadvantage is stated to be that the sewers are liable to flooding from

the Ouse. The whole of the sewage of the borough is collected at the pumping-station, the solids are there screened, and a storm overflow provided. At other times the pumps lift the sewage to a height of thirteen feet for one hundred and twenty-three acres, and to twenty-one feet for 30.25 acres. At night the sewage is stored in the sewers; the screened sewage is pumped through an eighteen-inch iron main pipe; the carriers are earthenware pipes eighteen inches to nine inches diameter, laid in banks above surface of the land; the distributors are earth-cut channels ploughed or dug from time to time as required. The solids are also used on the land. The under-drainage is by two-inch pipes, three feet deep in parts, and deep ditches round the fields. The crops grown are various. and the average value per acre of Italian rye grass is £7.66, permanent pasture, £6.37. Of root crops, parsnips show a yield valued at £20, potatoes, £16.84, and onions, £33.28. There is a large yield of celery amounting to £36 an acre. These yields were those of 1878. Wrexham has an irrigated area of 100.7 acres, representing the supply of sewage from 10,000 persons, or ninety-six persons per acre of farm. The daily supply is 48,000 to 80,000 cubic feet, no lift, and the soil is sandy and peaty, with a subsoil of gravel and sand.

As many of our readers know, Col. Jones is the manager; the sewage of Wrexham flows into settling tanks at the top of farm, and the liquid is allowed to flow on to the land in earth-cut carriers. In excess of 80,200 cubic feet of liquid, the wet-weather supply passes into a brook by storm overflows. The solid matter is removed, dried by a fan, and sifted, afterward made into artificial manure with bone-dust and sulphate of ammonia, and sold or used direct on the land. About three hundred tons of dry sludge is annually removed. The under-drainage of land is by eight-inch and six-inch pipes, six feet deep, and one hundred and twenty feet apart, though in wet places more pipes are laid three-and-one-half feet deep; little surface effluent passes off the farm. The rotation of crops is rye grass for three years, fourth year cereals, fifth year mangolds.

Among the large farms we note Birmingham with an irrigated area of 252.91 acres from a population of 112,500, or

four hundred and forty-four persons per acre of farm ; a daily supply of 481,000 cubic feet of sewage, which flows on the land, which is of a light peaty and stiff clayey nature, with gravel subsoil, liable to flooding. One part of the land receives pure sewage, another part unprecipitated sewage mixed with lime, and the remainder the effluent sewage after subsidence. Earth-cut carriers are used. The three settling tanks, three hundred and ninety feet by ninety feet by five-and-a-half feet, at the outfall are used alternately for a fortnight, while the sludge is removed. There are sixteen small settling-tanks, into which mere sludge deposits, the effluent sewage flowing off on the land. The sludge is treated (1) as semi-fluid sludge, which is pumped up and pushed on to the land in elevated wooden troughs by poles, and (2) heavy matter, consisting chiefly of road drift. About five hundred tons of moist sludge are raised daily. The land is prepared by raising small embankments, and then dividing it into a series of small tanks. After the sludge is consolidated in these to a depth of a foot, it is dug into the land to a depth of two feet. The cost of preparing the land and digging is £12 an acre. The judges say the sludge appears not to amalgamate with the soil, and remains a mass of worthless fibrous matter for at least two years, when it is ploughed. The under-drains are six feet deep, and thirty-three feet apart, the effluents are clear, and the chief crops are rye grass, mangolds and cabbages.

Croydon has an irrigated area of three hundred and twenty acres, a population represented of 55,000, or one hundred and twenty-one persons per acre ; a supply of 1,233,000 cubic feet daily, flowing on the land, which is of light peat and gravel, with a subsoil of yellow marl and gravel, but liable to excess of subsoil water. The rainfall is separated, and the sewage is conveyed in two outfall sewers ; the solid matter is extracted on Mr. Baldwin Latham's plan, and the liquid is distributed in earth-carriers. Our readers are pretty well acquainted with this farm. The farms of Doncaster, Leamington, and Reading are also tabulated. Leamington is a well-managed farm, and is profitable, the only disadvantage being the high lift, one hundred and thirty-two feet. The soil is sand, with gravel subsoil, and the sewage is conveyed to it, after the solid matter is partly removed, by earth-cut trenches and carriers.—*Building News.*

LEAD-POISONING FROM DRINKING-WATER.

DR. W. R. THOMAS thus writes in the *Medical Press*, January 27th :

" The following have been the symptoms and signs which I have most frequently met with indicating the presence of lead in the system : A cachectic and pallid appearance, a furred tongue, unpleasant taste, dyspeptic symptoms, as flatulence, pyrosis, pain after eating, a blue or red line at the junction of the gums with the teeth, colicky pains coming on irregularly in the abdomen, pain in the back, obstinate constipation ; in females, some disturbance of menstrual functions, generally amenorrhœa, sometimes for months, but occasionally menorrhagia ; a deficient secretion of urine, which frequently contained albumen, acid in the urine ; general pain in the extremities, and sometimes confined to the joints, considered to be of rheumatic origin by the patient ; a tendency to abort, mental confusion, loss of memory, disinclination for any mental exertion whatever, general debility, paralysis of the extensors of the forearm, tremor of the extremities generally, especially of the upper, impairment of vision, attacks of gout. We know that patients suffering from lead are prone to have attacks of gout, and, on the other hand, gouty patients are peculiarly susceptible to lead.

" A word about the blue line. Whenever teeth are absent, the blue line is not generally seen. Frequently when it is absent in front, I have succeeded in finding it by some of the molar teeth behind, and if absent entirely its place is, according to my experience, taken by a red line. The blue line, I believe, is formed by the chemical action of the sulphuretted hydrogen derived from the decomposing food which remains between the gum and the tooth, upon the lead of the blood or extra-vascular fluids of the gum, thus forming the sulphide of lead.

" Now, why does the water we drink become impregnated with lead in Sheffield ? We know that the water has to pass

through a leaden pipe from the main to the house, and we take it for granted that during its passage it takes up lead from the pipe. Ordinarily water contains a quantity of air, which acts upon the lead it comes in contact with, converting it into the oxide of lead, which is partly soluble, and is carried off by the stream. Now, water not only contains oxygen, but carbonic acid also, which, coming in contact with lead, forms the oxycarbonate which is precipitated, and deposits an incrustation on the inner surface of the pipe—a protecting and almost insoluble incrustation, which effectually prevents the water from acting further upon the lead and carrying it off as the oxide, so that the old pipes are better—not so poisonous—as new ones. These are the changes that take place when water contains nothing but air and carbonic acid, but we know that it nearly always contains salts as well. Water which has been contaminated by sewage is especially dangerous, as it contains nitrites, nitrates, and chlorides, which dissolve the lead ; and that which contains lime-salts, as the phosphates, carbonates, and sulphates, tends to produce a protecting deposit on the interior of the pipe ; so we see that contamination by organic matter is very dangerous. Vegetable matter, such as peat, is exceedingly dangerous, and is apt to form the deleterious compounds I have mentioned.

" Let us now for a moment consider what becomes of the poison which is continually being drunk by many of us in small doses day by day and year by year, and how it acts upon some of the organs and tissues of the body. It has been found deposited in the kidneys, liver, spleen, heart, lungs, brain, spinal cord, muscles, and bones. How it acts upon the different organs and tissues we do not know, although theories have been promulgated ; but this we do know, that certain post-mortem appearances have been met with, time after time, showing the effect of the poison. Muscles have been found atrophied until but little else has been left but their fibrous tissues, with occasionally hyperplasia of the latter.

" I believe that drinking-water containing small quantities of lead has ultimately a most disastrous effect upon the health of the public at large ; giving rise to symptoms which at first are trivial and slight, but which later on become serious. I believe that it tends to produce retraction of the gums ; early

decay of the teeth, so prevalent in Sheffield ; imperfect assimilation in stomach and bowels (owing to a diseased state of mucous membrane), with the consequent general anæmia, constipation, derangements of uterine tract, diseases of kidneys, serious affections of brain and nervous system generally, giving rise to symptoms at first slight—such as slight impairment of mental powers and general aches, and later on to symptoms pointing to more serious cerebral changes, and paralyses of different kinds.

" There is a tendency in us all naturally to walk through the world, if we believe that the water generally drunk is good, never looking for disease produced by impurities in that water ; but if once our attention is directed to that subject, it is astonishing how often cases turn up demonstrating that impurity.

" Now we might ask what ought to be done to prevent this. As a temporary and home remedy I would suggest the desirability of using carbon filters, which deprive the water of its lead, and, it is said, of its acidity ; the addition of a small quantity of calcium carbonate would be useful. As a remedy at the fountain-head, the advisability of using calcium carbonate to counteract the acidity, or of charcoal, or of both, might be considered by those who, no doubt, are extremely anxious that the water should be as pure as possible. Either of these could be utilized at the reservoir. Might not the leaden pipes have an internal layer of some material not easily affected by acids or salts ? is another question which has often occurred to me. These are only crude suggestions of mine, which I simply put forward for consideration."

FORESTS AND CLIMATE.

THE third number of *Petermann's Mittheilungen* for 1885 contains an article by A. Woeikof on the influence of forest on climate. The commencement of a scientific investigation of this subject was made when the Bavarian forest meteorological stations were established, and when Prussia, Alsace-Lorraine, France, Switzerland, and Italy followed the example. As a general rule it may be laid down that in the warm seasons as between forests and places close at hand which are treeless (1) the temperature of the earth and air are lowered in the former, (2) their variations are less, (3) the relative humid-

ity is greater. After examining observations as to evaporations, Herr Woeikof states that the influence of forests in diminishing evaporation from water and the soil is so great that it cannot be accounted for alone by the lower temperature of the hot months, the greater humidity, or even by the shade. An important influence, which has hitherto been but little appreciated, is the protection from the wind afforded by the trees, and this the writer regards as more important than all the others together in reducing the degree of evaporation. With regard to the influence of forests on rain and snow-fall, there is yet only a single series of observations supplying comparative statistics, and extending over a sufficiently long period. These were taken in the neighborhood of Nancy, and they show an important influence of forests in increasing the rainfall. It might appear that the effects of forest on rain in the climate of central Europe in winter would be small, for the difference between the temperature and humidity of the forest and the open is very little, and the quantity of moisture in the atmosphere is small. But the observations show that it is more at this time of the year that forests get much more rain. This the writer attributes to the clouds being lower, the resistance which the forest offers to the movement of the air and to the moist west wind. Forests retain rain by the undergrowths of grass, moss, etc., much better than open ground, and let water off superficially only after a heavy rainfall; the remainder filters upward slowly, and much of it is used for the evaporation of trees. Although forests, especially thick, luxuriant forests, cannot exist without certain supplies of moisture, yet it is the same to them when the supplies come, for they retain what they get, and use it over a long period. One example of this is the Lenkoran forest, on the west coast of the Caspian, where the vegetation is more luxuriant than in any other part of Europe, yet very little rain falls in summer, but the rainfall in autumn and winter is great. The water is stored by the forest, and is used in evaporation during the heat of summer. Humidity of the atmosphere, however, is not consistent with a high temperature, as the Red Sea shows; but in the forests the humidity is due to the evaporation of the leaves—in other words, to a process by which heat is converted into work, and hence the coolness.

Herr Woeikof then endeavors to ascertain the influence of

forests on the climatic condition of their neighborhood of the western parts of the Old World, between the thirty-eighth and fifty-second degrees north latitude, the place selected being in all cases in the open. Thus for the fifty-second degree eight stations are taken between Valencia, in Ireland, on the west, and the Kirghiz steppes on the east; for the fiftieth, Guernsey on the west, Semipalatinsk on the east, and thirteen stations, and so on for each two degrees of latitude, to thirty-eight degrees. The general result of the observations in fifty stations in six different degrees of latitude is that in western Europe and Asia large forests have a great influence on the temperature of the places near them, and that by their influence the normal increase of temperature as we travel eastward from the Atlantic Ocean to the interior of the Continent is not merely interrupted, but they give places far removed from the coast a cooler summer than those actually on the sea. A striking example of this is Bosnia. An examination of the statistics show (1) that in Bosnia the summer is 2.5° to 4.5° cooler than in Herzegovina; (2) even on the island of Lissa, in the full influence of the Adriatic Sea, the summer temperature is more than a degree higher than that of Bosnia, which is separated by lofty mountain ranges from the sea. Bosnia owes this comparative cool summer to its great forests, while Herzegovina is almost disafforested. To sum up: Forests exercise an influence on climate which does not cease on their borders, but extends over a larger or smaller adjacent region according to the size, kind, and position of forest. Hence man by afforestation and disafforestation can modify the climate around him; but it is an extreme position to hold that by afforestation the waste places of the earth can be made fertile. There are places incapable of being afforested, which would not give the necessary nourishment to trees.—*Nature.*

THE SALUBRITY OF FORESTS is probably due to the joint functions of the trees in draining the soil, distilling the moisture, emission of aromatic vapors, and absorbing the emanations of vegetable putrefaction. Moisture is an indispensable condition of forests, but they do not have, as is popularly supposed, much if indeed any influence over the rainfall. The rain produces the forest and not the forest the rain.—*Bell's Climatology*, p. 96.

EDITOR'S TABLE.

☞ *This number has been unavoidably delayed on account of printers' strike.*

WOOLLEN CLOTHING.

IT is remarkable with regard to clothing that at the present time there appears to be a general tendency to exercise the preference for the kind of material which is identified with the earliest history of mankind. Indeed, the only garment worn by the pre-historic man was, as it is even at the present day by some savage tribes, *woollen*—the wool-covered animal skin, and, apparently, without regard to climate. The transition from this to the textile fabrics made of the wool of the sheep took place at a very early period, and long before the use of any other material for the same purpose; insomuch, indeed, as to have been of almost universal use among the most advanced nations. Royal robes, head-dresses, and mantles of the finest wool; and tent-coverings, carpets, and curtains of heavier texture were exclusively manufactured of wool by the Asiatics, in such profusion that for many ages flannel appears to have been the only textile in use. The kingly robes of all the Oriental nations, and the imperial purple of Rome, were all of pure wool colored with Tyrian dyes, whose perfect beauty, after being lost to art for ages, has been reproduced in our own day by the superb aniline dyes, and woollen garments are now manufactured with an exquisitness of texture, finish and color, unsurpassed by any other fabric. This is the more interesting when viewed in its hygienic aspect.

Wool has long since been demonstrated to be a bad conductor of heat and a powerful absorber of moisture. Almost a hundred years ago (Phil. Trans., 1792) Count Rumford showed that a thermometer wrapped with cotton wool, and heated by immersion in boiling water, took 1046 seconds to lose 135° F. when plunged in a bath of melting ice; while

under the same circumstances when sheep's wool was employed, 1118 seconds elapsed before a like sinking of the thermometer took place, thus showing the greater conducting power of cotton, and consequently the superiority of wool for maintaining warmth.

Pettenkofer, a few years ago (Zt. für Biol. band. i. p. 185), made a series of interesting experiments, demonstrating the hygroscopic power of wool compared with linen. He showed that linen not only absorbs much less water, but parts with it much more quickly. For example: Equal surfaces of linen and flannel being exposed to the air after being placed in equal conditions of absorption, the linen lost in 75 minutes 5.933 grammes, and the flannel only 4.858 grammes of water. Subsequently the evaporation from the linen lessened, as was to be expected, as it was becoming drier; but that from the flannel continued to pass off moderately, showing the much more rapidly cooling effect of the linen.

The porosity of clothing—that is, the facility with which air passes through it, is also a point of much importance; and this, too, shows the great advantage of flannel clothing. By an equal pressure equivalent to a column of water 4.5 centimetres high, an area of 1 centimetre diameter forced air through as follows: Through flannel, 10.41 litres; lamb-skin, 6.07; linen, 6.03; wash-leather, 5.37; silk fabric, 4.14; glove-leather, .15. It thus appears that flannel, though the warmest fabric for clothing, is the most porous, and therefore the least liable to retain body odors.

The most important element is the extraordinary degree of absorptivity of flannel, and this property it is which, above all others, gives flannel its superiority over all other fabrics as an article of clothing.

Perspiration, sensible or insensible, is at all times necessary to maintain the equable temperature of the body; but during exercise, when perspiration is active and to such a degree as, when the exercise ceases, to chill the body without the interposition of such clothing as will maintain due warmth despite the evaporation from the surface, woollen clothing demonstrates its superiority.

Exposed to perspiration, the moisture penetrates the wool fibres, distends and lies between them, insomuch that the

amount of water absorbed and held by hygroscopic absorption into and between the fibres may be more than equal to the weight of the wool. By absorbing the perspiration as fast as it is emitted, and, if unrestrained by impervious overclothing, allowing it to pass off into the atmosphere almost as fast as it accumulates, insensibly, the skin is kept dry, and an equable temperature of the body maintained, not only during the process of active perspiration, but subsequently, and by this means chill is prevented.

On the other hand, if active exercise be taken in linen or cotton shirts, and perspiration be induced as in the former case, the moisture, instead of being absorbed and allowed to pass off into the atmosphere, clings to and saturates the texture, which sticks to the skin, clogs the pores, and, on leaving off exercise, so rapidly cools the surface by the loss of heat as to induce chill and disease.

Moreover, flannel acts as a gentle stimulus to the skin, and thereby exercises a highly beneficial influence in removing the scurf, keeping the pores open and clean, and promoting its healthy action.

These differences make it plain why woollen clothing is alike superior to other material in both cold and hot weather—it meets and modifies the effects of the variable conditions of exercise and temperature.

Flannels are now manufactured in all degrees of thickness and weight, and can therefore be chosen with special reference to climate or occasion.

The objections raised against the use of flannel are for the most part founded on ignorance of its advantages, prejudice, obstinacy, and bravado, which it is the object of this notice to correct.

The disadvantage of flannel is due to the way in which it is ordinarily washed. By the use of boiling water, excess of soap, rubbing and wringing, the fibre becomes smaller, harder, and less absorbent. To prevent such results flannels should be *dipped* only in *warm*—never hot—soap-suds and surged about for a few moments, and then rinsed in two or three warm waters till the soap, with the dirt, is entirely removed; and then, *without any rubbing or wringing whatever*, hung up to dry.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The forthcoming meeting at Toronto, Canada, Tuesday, October 5th, at 10 o'clock A.M., to continue four days, promises to be of unusual interest. The meetings will be held in Shaftesbury Hall, on Queen Street, West.

The Executive Committee have selected the following topics for consideration at said meeting:

I. The Disposal of the Refuse Matters of Cities and Towns.

II. The Condition of Stored Water-Supplies, and their Relation to the Public Health.

III. The Best Methods and the Apparatus Necessary for the Teaching of Hygiene in the Public Schools, as well as the Means for Securing Uniformity in Such Instruction.

IV. Recent Sanitary Experiences in Connection with the Exclusion and Suppression of Epidemic Disease.

V. The Sanitary Conditions and Necessities of School-Houses and School-Life. (Lomb Prize Essays.)

VI. The Preventable Causes of Disease, Injury, and Death in American Manufactories and Workshops, and the Best Means and Appliances for Preventing and Avoiding them. (Lomb Prize Essays.)

VII. Plans for Dwelling-Houses. (Lomb Prize Plans.)

Upon the above topics a good number of able papers have already been prepared by well-known sanitary writers. Authors from several sections of the United States, Canada, and England have signified their intention of being present with papers. In addition to papers upon the selected topics, several upon miscellaneous sanitary subjects will be presented for the approval of the Executive Committee, and, if accepted, will be assigned a place on the programme.

All persons who propose to present papers must be governed by the by-laws of the Executive Committee.

MORTALITY AND MORBILITY STATISTICS AT MOST RECENT DATES.

ALABAMA.—No State Board report. *Mobile*, population 31,295, reports 84 deaths for the month of July, of which 44 were colored. Twenty-four were of children under five years

of age. The annual rate per 1000 was 32.16. There were 19 deaths from zymotic diseases and 13 from consumption.

CALIFORNIA.—Reports received for the month of July show a continuously low rate of mortality throughout the State. There has been a slight increase in the rate of San Francisco and Oakland, but nothing to excite remark. Consumption continues to be the most constant factor in the mortality rate; but 102 deaths from this cause during the month shows a slight decrease since June report. Of infectious diseases, *cholera infantum* and other *diarrhœal diseases* have prevailed quite extensively in San Francisco, San José, Benicia, Ione, Williams, Gridley, Napa, Mariposa, and Oakland. *Diphtheria* and *croup* have been reported in San Francisco, Santa Cruz, Etna Mills, Truckee, Fall River, Oakland, Napa, Hill's Ferry, and Los Angeles. *Typhoid-fever* has increased in prevalence in Santa Cruz, Salinas, Sacramento, San Francisco, Alturas, Jolon, Anaheim, Lincoln, Elk Grove, Fort Bidwell, Cottonwood, and other places. *Whooping-cough* prevails in Nicolaus, Jolon, Anaheim, Napa, Grass Valley, Modesto, Ione, and Martinez. *Scarlet-fever* is reported in Susanville, Truckee, Alturus, Napa, and Shasta, but generally of a mild type.

CONNECTICUT.—Report for the month of July includes all the cities of the State. The total number of deaths registered was 554, as against 378 in June. This marked increase in mortality with the accession of hot weather is not exceptional as between June and July. It is an annual experience, and the excess is caused almost exclusively by the fatal forms of diarrhœal diseases, especially among infants. New Haven afforded the usual example of this during the month of June. The following is an extract from the report of the health officer to the Board of Health:

"Although the deaths from zymotic diseases numbered 54, infantile diarrhœa was the registered cause of 42 of them.

"The location of these deaths indicates the most unsanitary portion of the city in respect to the immediate domestic surroundings of the sufferers. The 42 deaths occurred in 40 different houses. The sanitary inspection reports of 30 of these houses are now on record in this office, and by reference to them it appears that all have privy vaults save two. Of

these two one had 34 persons resident in the house, and probably overcrowding had much to do with the fatal result, and the other had 12 persons, and the plumbing was reported to be 'bad,' and the kitchen 'unsanitary.' In these 30 houses there were 36 untrapped sinks. About these 30 houses were 15 cesspools. The other houses were either connected as regards their kitchen with the sewers or threw their slops on the ground. Many of these houses were supplied with water from wells in their yards, in close proximity to the cesspools and privy vaults. Most of the places which have not yet been inspected are in localities where exactly the same conditions are known to exist. It cannot be a mere coincidence that year after year throughout the heated term there should be this constant relation between masses of filth in subterranean store-vaults and such fearful mortality among the infants. It cannot be a mere coincidence that in all great cities where careful observation is made the same facts exist. It is a most significant fact, too, that everywhere in every city the abolition of cesspools and privy vaults by the introduction of sewers has markedly decreased the death rate. There has been no exception yet observed to this rule."

New Haven reports for July 145 deaths in its population of 80,000, representing a death rate of 21.4 per 1000. The deaths of children under five years of age numbered 80. There were 54 deaths due to zymotic diseases, and 19 to consumption.

Hartford.—Diarrhœal diseases to a slight extent, but not half the average in July as during the five years preceding. July has been a very healthy month, the decrease in mortality being mainly in the zymotic class.

Bridgeport.—Much less sickness than in July of 1883, 1884, or 1885. For the first six months of the present year the total mortality was but 446, against 519 for the corresponding time last year.

Waterbury.—Never had as many deaths before in Waterbury. Dysentery is prevailing with much fatality. Over fifteen per cent of the deaths are due to this disease. There is very little typhoid-fever, but a good deal of infantile diarrhœa.

Meriden.—Scarlet-fever still epidemic. Thirteen cases in July, and one death. There has also been more diarrhœa and dysentery than in any previous year for some time.

DELAWARE.—No State Board Report. *Wilmington*, estimated population 55,800, reports 99 deaths during July, representing a ratio of 21.30 per 1000. Forty-nine deaths were of children under five years of age. From zymotic diseases there were 16 deaths, and from consumption 12.

THE DISTRICT OF COLUMBIA has an estimated population of 205,000, of which 136,000 are whites and 69,000 colored. There are reported for the month of July 441 deaths—220 whites and 221 colored—representing an annual death rate per 1000 of: Whites, 19.41; colored, 38.43; and for the total population, 25.71. From zymotic diseases there were 76 deaths among the whites and 66 among the colored—a total of 142. From consumption there were 58 deaths in all, of which 27 were whites and 31 colored.

ILLINOIS.—No State Board report received. *Rock Island*, with 11,650 inhabitants, reports for five weeks ending July 31st, 18 deaths. Of children under five years of age there were 8 deaths. Annual death rate per 1000, 11.7. From zymotic diseases there was 1 death, and from consumption there were 2 deaths.

LOUISIANA.—This Board has been considerably exercised during the last month on account of the occurrence of a few cases of yellow-fever at Biloxi, Miss., the nearest shore communication with the Ship Island quarantine, and by rail in almost daily communication with New Orleans. The nature of the disease, on first report, being disputed by the health authorities of Biloxi, Drs. Holt and Salomon, president and secretary of the Louisiana Board, forthwith repaired thither, and by personal inspection satisfied themselves of its true character, and so reporting to the Board, Biloxi was at once quarantined. But their report and the action of the Louisiana Board of Health have been energetically disputed and criticised by the Biloxi authorities and physicians, and by Dr. Murray, the Quarantine officer of Ship Island. It is gratifying to state, however, that the authorities of Biloxi, while denying the nature of the disease, energetically exerted themselves to prevent its possible spread, and, aided by the Louisiana State Board, have in about ten days only so thoroughly succeeded in their effort that, at a special meeting of the Board on

September 11th inst., on motion of Mr. Barr, the following action was taken:

"*Whereas*, there have been no new cases of fever at Cadet Point, Biloxi, since September 3d; and,

"*Whereas*, Sanitary Officer L. D. Allen reported that there are now no sick in the lately infected locality; and,

"*Whereas*, this Board has the pledge of his Honor the Mayor of Biloxi to immediately notify it of the occurrence of any new cases of suspicious fever in said district.

"*Be it resolved*, That the quarantine restrictions recently imposed by this Board against the town of Biloxi be and are hereby removed."

The New Orleans *Times-Democrat* wisely remarks: "The quarantine of Biloxi has had, materially and morally, the very best effect. It has rooted out the fever prevailing in Biloxi, whatever was its character, and brought about the complete disinfection and sanitation of that town.

"It has convinced the whole country how zealous New Orleans and all the Gulf towns are in the interest of health, and how carefully they watch the Southern coast of the United States to prevent the invasion of an epidemic.

"It has shown the danger to the whole country of the proximity of the Quarantine Station at Ship Island, and has resulted in the adoption of additional restrictions there for the prevention of intercourse between the mainland and the island that will relieve the coast of the danger of infection.

"It has proved that yellow-fever—or even if it were not yellow-fever, but something else of a severe and infectious type—can be exterminated and utterly destroyed by the proper precautionary measures; and thus has demonstrated the efficacy of quarantine, isolation, and disinfection.

"It has improved the *entente cordiale* between the various sanitary and health associations of the country, increased the friendly relations between them, and shown that they will co-operate for the protection of the country from disease.

"And, finally, it will serve as a warning to all the towns and villages on the Gulf and anywhere else that there is danger of the fever, to keep a sharp lookout, report and thoroughly investigate every suspicious case, as in this manner alone can they feel proof against quarantine.

"Altogether, the Biloxi episode, which is now ended by the act of our Board of Health, has served to arouse the Gulf coast

to the importance of sanitation, and its consequent effects in the future will be most salutary and beneficial."

New Orleans, with a population of 238,000—173,500 whites and 64,500 colored—reports for the month of July 360 deaths of whites, showing a ratio per 1000 of 24.89, and 199 deaths of colored, showing a ratio of 37.02 per 1000; total deaths, 559, with a ratio per 1000 of 28.18. Of deaths under five years there were, of whites and colored, 228.

The deaths from zymotic diseases numbered 130—whites, 84; colored, 36. The deaths from consumption numbered 69, of which 36 were whites and 33 colored. Diarrhœal diseases caused 58 deaths.

MARYLAND.—No State Board report. *Baltimore* reports for five weeks ending July 31st, 1003 deaths in a population of 417,220, representing an annual death rate of 27.5 per 1000. There were 632 deaths under five years of age. Deaths from zymotic diseases numbered 396, and from consumption 117.

MASSACHUSETTS.—The newly-organized State Board of Health, as at present constituted, consists of Drs. Henry P. Walcott, Elijah W. Jones, and Frank W. Draper; and Messrs. Julius H. Appleton, Thomas K. Lothrop, Hiram F. Mills, and James White. Secretary and Executive Officer of the Board, Dr. Samuel W. Abbott.

The joint committee of the Board of Health and City Council appears to have come to about the same conclusion in regard to the necessity for the disinfection of imported rags as the Chamber of Commerce Committee of New York, which we reported in our June number (Vol. XVI., p. 564). Now we learn from our contemporary, the Boston *Medical and Surgical Journal* of September 2d, the newly-organized Massachusetts State Board of Health has taken up the question.

"Circulars have been issued within a few days, to the manufacturing companies using rags, asking for data regarding the kind and amount of rags used, and the number of persons employed in the handling of the rags prior to the time when the latter undergo boiling or chemical treatment, which, of course, is the limit of viability of any possible contagion that may cling to them. Questions are also asked regarding the precautions as to vaccination, the ventilation of dusting-rooms and other means for protecting the health of employés, as well as regarding the occurrence of actual cases of infectious disease among the operatives.

"The latter class of questions are, of course, likely to receive the most satisfactory replies through the medical profession. Hence a circular has been prepared for physicians practising in the paper towns, asking for particulars of cases of small-pox among such operatives, with any details that have been learned regarding the source of the contagion, whether from other cases in the neighborhood, or with no other evident cause than the rags. Also, in regard to other infectious diseases, especially cholera, whether when epidemic they have appeared sooner or more generally among rag-workers than in the community at large. Moreover, the occurrence of locally infectious or non-infectious diseases, particularly of the skin or of the lungs, due to mechanical irritations are made the subject of inquiry."

The replies to these questions by the manufacturers may be anticipated by what they have heretofore stated; but it is sincerely to be hoped that the work undertaken by the State Board will be so thorough as to leave no room for doubt in regard to the danger of filthy rags, no matter whence they come.

MICHIGAN.—Reports for the month of July, 1886, compared with that of the preceding month, indicate that cholera morbus, diarrhœa, cholera infantum, and dysentery increased, and that influenza, rheumatism, pneumonia, and consumption decreased in prevalence.

Compared with the average for the month of July in the eight years, 1879–86, intermittent-fever, remittent-fever, measles, consumption, and dysentery were less prevalent in July, 1886.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of July, 1886, at 35 places, scarlet-fever at 22 places, typhoid-fever at 17 places, measles at 10 places, and small-pox at 2 places.

Reports from all sources show diphtheria reported at 12 places less, scarlet-fever at 26 places less, typhoid-fever at 11 places more, measles at 6 places less, small-pox at 1 place less in the month of July, 1886, than in the preceding month.

Compared with the preceding month the temperature in the month of July, 1886, was higher, the absolute humidity and the day ozone were more, the relative humidity and the night ozone were less.

For the month of July, 1886, compared with the average of corresponding months for the eight years, 1879–86, the temperature was slightly lower, the absolute and the relative humidity and the night ozone were about the same, and the day ozone was slightly more.

Detroit reports for the month of July 403 deaths in a population of 175,000, of which 124 were under five years of age. This mortality represents an annual death rate of 27.11 per 1000. There were 182 deaths from zymotic diseases and 29 from consumption.

We are gratified to learn that small-pox is extinguished in Detroit, and, as an outcome of the recent unpleasantness between the health officer and some members of the Board of Health in the event of its recurrence, the health officer has, after five years' tireless effort, secured the necessary grounds and already has finished and equipped three cottages for its proper care, as also of other infectious diseases.

MINNESOTA.—Infectious diseases reported during the month of July: *Diphtheria*, 44 cases, 24 deaths; *scarlatina*, 3 cases. *Diseases of animals:* Cases of glanders remaining on hand, isolated or not accounted for at first of month, 40; reported during the month, 33; killed, 11; released, 2; isolated, 0; remaining August 1st isolated or not accounted for, 60. Under the last item come animals still under isolation for better evidence of the disease, and most of all, animals discharged but not officially reported. The local boards, particularly township boards, are improving in their methods, with experience.

St. Paul reports 196 deaths during July in a population of 120,000, representing an annual death rate of 19.60 per 1000. There were 146 deaths of children under five years of age. There were 105 deaths from zymotic diseases and 7 deaths from consumption.

Minneapolis, with a population of 129,200, reports for the month of July 213 deaths, of which 152 were under five years of age, representing an annual death rate of 19.65 per 1000 inhabitants. From zymotic diseases there were 42 deaths, and from consumption 16.

MISSOURI.—No State Board report. *St. Louis* reports for July, in a population of 400,000, a mortality of 856, represent-

ing an annual death rate of 24.57. There were 367 deaths under five years of age. From zymotic diseases there were 301 deaths, and from consumption 85 deaths.

NEW JERSEY.—No State Board report. *Newark*, with a population of 157,485, reports 323 deaths during July, showing an annual rate per 1000 of 24.65. Of children under five years of age there were 135 deaths. There were 80 deaths from zymotic diseases and 32 from consumption.

Hudson County reports 423 deaths during May in a population of 250,734, making its annual rate per 1000, 20.2. There were 161 deaths under five years of age. There were 34 deaths from zymotic diseases and 60 from consumption.

Paterson reports 159 deaths during July among 63,287 inhabitants, showing an annual rate of 30.1 per 1000. There were 108 deaths of children under five years of age. From zymotic diseases there were 88 deaths, and from consumption 15 deaths.

NEW YORK.—Dr. E. M. Moore, President of the Board hitherto, is reported as having resigned his membership, in virtue of his ineligibility, being no longer Health Commissioner of Rochester. *Bulletin* reports mortality for July 9376, of which 53.3 per cent were under the age of five years. From zymotic diseases there were 3515 deaths, a ratio of about 375 per 1000 total mortality. From diarrhœal diseases, which largely preponderate over all other causes of death, the ratio per 1000 is 287.56; or considerably more than one fourth; they constitute more than three fourths of the deaths from zymotic diseases. In July, 1885, the mortality, being largely in excess of any other month in the year, was about the same as that of this month; the ratio then of deaths from diarrhœal diseases was 320.00 per 1000, and to zymotic diseases about 75 per cent. From typhoid-fever the ratio per 1000 total mortality is 8.00; from croup and diphtheria, 40.95. From consumption the ratio of mortality is 101.22 per 1000, and 217.91 per 1000 above the age of five years. The combined death ratio per 1000 from zymotic diseases, consumption, and puerperal diseases is 482.08. From acute respiratory diseases there were 57.68 deaths per 1000. There have been received 240 delayed returns for June; 36 were from Cohoes, 3 from

Bath, 7 from Seneca Falls, 8 from Haverstraw, 17 from Jamaica, 4 from Amherst, and 18 from Newtown, all of which places, usually reported in the *Bulletin*, failed in whole or in part to send returns in time for the last issue.

New York City, with an estimated population of 1,439,000, had 4198 deaths, representing an annual rate of 34.35 per 1000. Deaths under five years, 2499—59.5 per cent of total mortality. The chief causes of death were: Diarrhœal diseases, 1382; consumption, 439; acute respiratory diseases, 261; croup and diphtheria, 193; whooping-cough, 60; measles, 58; scarlet-fever, 25; typhoid-fever, 22; cerebro-spinal-fever, 20. Deaths from zymotic diseases 420.43 per cent of the deaths from all causes.

Brooklyn, with 690,000 inhabitants, had 1711 deaths, of which 1075 were under five years of age; death rate per 1000, 29.50. From zymotic diseases per 1000 deaths from all causes, 431.90; 62.8 per cent of the total mortality was of children under five years. The chief causes of death were: Diarrhœal diseases, 586; consumption, 156; acute respiratory diseases, 108; croup and diphtheria, 73; whooping-cough, 23; scarlet-fever, 10; malarial diseases, 17; typhoid-fever, 4.

Buffalo, with a population of 202,818, reports (for five weeks ending July 31st) 467 deaths—267 under five years of age. Death rate, 23.45. From zymotic diseases per 1000 deaths from all causes, 283.28.

Rochester reports 120,000 inhabitants and 178 deaths—76 under five years of age; annual death rate, 17.80. From zymotic diseases per 1000 of deaths from all causes, 235.95.

NORTH CAROLINA.—*Bulletin* for month of July reports 132 cases of *typhoid-fever*, besides "more or less" in several counties without enumeration. It appears to be especially prevalent in Cabanus, Catawba, Cumberland, and Davidson counties—respectively, 10, 39, 40, and 15 cases. *Typho-malarial* and *intermittent-fevers* are also frequently reported, and in some counties very prevalent. *Whooping-cough* prevails extensively in Cumberland and Davidson counties—100 cases in the former and 150 in the latter—and more or less in nearly every county reported. *Measles* is particularly prevalent in McDowell County—20 cases—not much elsewhere. In

Cherokee County "about 60 cases of *flux*," chiefly among children, with 6 deaths. *Hog-cholera* in Burke, Chatham, and Lenoir counties; and *chicken-cholera* in Davidson and Warren counties.

OHIO.—No report received. In our review of *Cincinnati's* annual report a typographical error occurs; p. 183, thirteenth line, should read marriages and births instead of "marriages and deaths are confessedly incomplete." The registration of deaths is claimed by the registrar to be complete.

PENNSYLVANIA.—No State Board report. *Philadelphia*, with an estimated population of 971,363, reports 2121 deaths for five weeks ending July 31st, of which 1058 were under five years of age. This mortality represents an annual death rate of 22.7 per 1000. From zymotic diseases there were 512 deaths, and from consumption 231.

Pittsburgh reports for the four weeks ending July 24th, 455 deaths in a population estimated at 200,000, of which 284 were under the age of five years. From zymotic diseases there are reported 78 deaths, and from consumption 25 deaths. Annual rate, 29.0.

There has been a good deal of commotion in Pittsburgh for some weeks past on account of the taste for *dirty* water, and its usual results, typhoid-fever and other diseases. Dr. Germer, of Erie, President of the State Board of Health, has been active in inspecting and, as far as practicable, making the people sensible of the loathsome habit of drinking the seepage of cesspools and privy vaults mixed with their well waters. In making a general summary of the situation in West Elizabeth, he is reported in the Pittsburgh *Dispatch* of August 10th as having said:

"It is a question of dollars and cents. The landlords will not make the necessary improvements until they are forced to do so. Here we find many houses which are seated low, and into which all of the surface water, together with the contents of overflowing vaults, stables, and pig-styes flows. This corruption accumulating in the wells and cellars is the prime cause of disease. The borough officers, I can see, are endeavoring to construct a sewerage system, but the fault lies with the property owners who allow their houses to remain in a condition that will endanger the lives of their tenants."

Conditions not peculiar to Pittsburgh and vicinity, but in many towns throughout the State and country.

Erie, with an estimated population of 33,215, reports for the month of July 50 deaths, of which 20 were under five years of age. Annual death rate per 1000, 15.09. From zymotic diseases there are reported 4 deaths, and from phthisis 8 deaths.

RHODE ISLAND.—No State Board report. *Providence* reports for July 222 deaths in a population estimated at 120,000, of which 101 were less than five years of age. This mortality represents an annual death rate of 22.20 in 1000 of population. Of the causes of deaths, there were from zymotic diseases 78, and from consumption 29.

TENNESSEE.—*Bulletin* reports the diseases most common in July seem to have been *dysentery*, *malarial-fever*, *diarrhœa*, and other *bowel affections*. *Malarial-fevers* are mentioned especially in Carroll, Chester, Decatur, Dyer, Fayette, Gibson, Giles, Hardin, Hawkins, Haywood, Houston, Humphreys, Lincoln, Putnam, Rhea, Rutherford, Sevier, Shelby, Stewart, and Wayne counties. *Dysentery* is noted in Anderson, Bledsoe, Blount, Bradley, Cannon, Cocke, Coffee, Hardeman, Henry, James, Jefferson, Lake, Marshall, McMinn, Polk, Rhea, Robertson, Sullivan, and Weakley counties. *Typhoid-fever* is mentioned in Bradley, Cocke, Gibson, Hamilton, Hardin, Hawkins, Jefferson, Knox, Marshall, McMinn, Putnam, Rhea, Rutherford, and Stewart counties. More or less *whooping-cough* in Carroll, Cocke, Gibson, Giles, Hawkins, Houston, Humphreys, Knox, Maury, and Obion counties. *Measles* occurred in Hamilton, James, McMinn, Wayne, and Williamson counties. No mention of *diphtheria* except in McMinn.

Death Rates.	Chattanooga,	white,	23.29 ;	colored,	37.11 :	28.71
" "	Clarksville,	"	4.80 ;	"	16.00 :	9.00
" "	Knoxville,	"	18.16 ;	"	34.00 :	21.58
" "	Memphis,	"	19.39 ;	"	33.61 :	24.44
" "	Nashville,	"	14.66 ;	"	37.74 :	22.88

The meteorological features for July were the severe electric and wind storms of the 8th and 14th in various portions of the State, and the small proportion of cloudiness. The mean

temperature was 75°.37, which was slightly below the means of July of the two previous years, and proportionately above that of July, 1883. The highest temperature, 97°, was recorded on the 30th, and was 1° below the maximum for July of the two previous years. The lowest temperature, 49°, recorded on the 16th, was slightly above the July minimum of the three preceding years. The monthly range of temperature was 48°, respectively 5° and 3° less than that for the corresponding month in 1884 and 1885. The mean precipitation was 3.26 inches, 1.08 inches less than in July, 1885, and 2.29 inches less than in July, 1884. Of this amount the Eastern Division received an average of about 4¾ inches, the Middle Division received about 2½ inches, and the Western Division received nearly 3 inches.

VIRGINIA.—No State Board report. *Richmond* reports for July 181 deaths—84 white and 97 colored. The white population, estimated at 42,000, and the colored at 33,000, show the respective death rates to be 24.00 and 25.27 per 1000, and for the whole city 28.96. There were 82 deaths under five years of age. Zymotic diseases caused 31 deaths of whites and 36 deaths of colored, and consumption caused 7 deaths of whites and 10 deaths of colored.

Lynchburgh reports for five weeks ending July 31st, white population, 9420; colored population, 11,000; total, 20,420. Deaths, 37—9 white, 28 colored. Rate per 1000, white, 9.9; colored, 26.5; total, 19.3. Deaths under five years of age, 23. From diarrhœal diseases 13 deaths, and from consumption 7 deaths.

WISCONSIN.—No State Board report. *Milwaukee* estimates its population at 160,000. During the month of July there were 299 deaths, of which number 117 were under the age of five years. The annual death rate per 1000 represented by these figures is 21.49. Eighty deaths were from zymotic diseases and 23 from consumption.

MORTALITY STATISTICS ABROAD, and the annual death rates per 1000 at the most recent dates. Of 14 large English cities the average annual rate for the week ending August 21st was 19.9. The lowest rate was Bristol, 15.1; and the highest Liverpool, 28.9. The London rate was 17.9; Paris, 21.2;

Havre, 31.5; Rheims, 34.5; Nancy, 22.3; Breslau, 32.1; Cologne, 25.8; Brussels, 29.3; Marseilles, month of June, 34.4; Christiania, 25.8. For the week ending August 14th: Amsterdam, 22.8; Rotterdam, 20.0; Hague, 31.1; Lyons, 24.4; Berlin, 29.7; Hamburg, 25.3; Munich, 27.6; Dresden, 23.3; Leipzig, 27.5; Frankford, 18.5; Koenigsberg, 31.0; Magdeburg, 28.0; Hanover, 23.4; Bremen, 14.7; Dantzig, 29.9; Nuremberg, 32.7; Stuttgart, 20.5; Strasburg, 30.2; Vienna, 23.0; Buda Pesth, 33.5; Prague, 28.9; Stockholm, 22.5; Christiania, 25.8; St. Petersburg, 27.4; Warsaw, 29.8; Odessa, 37.4; Venice, 29.3; Bucharest, 26.3; Buenos Ayres, month of June, 24.4. For the week ending August 5th: Cairo, 56.2; Alexandria, 51.9; Port Said, 31.4; Suez, 51.2; Rome, week ending July 3d, 23.5; Milan, month of June, 29.9; Genoa, month of June, 21.3; Bologna, month of July, 42.9; Bombay, week ending July 20th, 23.7; Calcutta, week ending July 26th, 18.0; Madras, week ending July 9th, 35.4.

INFECTIOUS DISEASES ABROAD, at most recent dates, as follows:

Cholera.—Trieste, week ending August 21st, 26 deaths; Venice, August 8th–14th, 15 deaths; Province of Venice, August 6th–11th, 71 deaths; Bologna, month of July, 117 deaths. By latest telegraphic reports, September 15th, Pesth, 1 death, 2 new cases reported; Trieste, 3 deaths, 19 cases reported. In Italy, since latest previous reports: Torre dell' Annunziata, 5 new cases, 4 deaths; Ravenna, 7 new cases, 1 death; Ferrara, 11 new cases, 4 deaths; Putignano, 11 new cases, 6 deaths; all the other infected districts, 21 new cases, 10 deaths. In Japan: "The total number of cholera cases throughout Japan since its first appearance this year, according to the Japan *Gazette*, is 59,000, of which 37,000 resulted fatally. The indications are that the epidemic is now abating. Intelligence from Seoul, Corea, says cholera is still raging in that city. According to the official returns the fatal cases for July this year were 38,600 out of a population of 250,000. Outside of the capital the epidemic is equally fatal. At Shin King, province of Keishado, 5000, and at Torai 6000 deaths are reported to have occurred in one month."

Small-pox.—Paris, week ending August 21st, 2 deaths;

Marseilles, June, 138 deaths; Bordeaux, July, 1 death; Rheims, August, 1 death; Nice, July, 5 deaths; Buda Pesth, August 8th–14th, 14 deaths; Prague, August 8th–14th, 1 death; St. Petersburg, August 8th–14th, 2 deaths; Warsaw, August 8th–14th, 2 deaths; Milan, June, 15 deaths; Rome, June 27th to July 3d, 5 deaths; Genoa, June, 13 deaths; Venice, August 8th–14th, 1 death; Bologna, July, 6 deaths; Saragossa, July, 1 death; Alexandria, July 30th to August 5th, 1 death; Buenos Ayres, June, 60 deaths; Brussels, August 15th–21st, 1 death.

Measles was specially prevalent at latest dates in London, Groningen, Paris, Marseilles, Berlin, St. Petersburg, and Bologna.

Scarlet-fever prevailed, at latest accounts, in Hamburg, Paris, Buda Pesth, St. Petersburg, and Bologna.

Typhoid-fever was prevalent, at most recent dates, in Paris, Marseilles, Bordeaux, Besançon, Milan, Bologna, Barcelona, Cairo, Bombay, Calcutta, and Madras.

Diphtheria caused 10 or more deaths during the latest weekly report received from London, Glasgow, Paris, Hamburg, Milan, Genoa, Barcelona, Cairo, and Buenos Ayres.

VITAL STATISTICS OF IMMIGRATION AT THE PORT OF NEW YORK FOR JULY, 1886.—(7) Nevada, Liverpool, 690 passengers, 4 deaths; (10) Geiser, Copenhagen, 765 passengers, 1 birth; (11) Russia, Hamburgh, 736 passengers, 1 death; (13) Ethiopia, Glasgow, 272 passengers, 1 death; (15) Wisconsin, Liverpool, 404 passengers, 1 birth; (24) Eider, Bremen, 652 passengers, 1 birth; Gillert, Hamburgh, 487 passengers, 1 birth; (26) Umbria, Liverpool, 597 passengers, 1 death. Total: 4603 passengers, 4 births, 7 deaths.

OBITUARY.

FRANK HASTINGS HAMILTON, M.D., LL.D., died of pulmonary disease, in his seventy-third year, at his house in New York, August 11th, 1886. He was born in Wilmington, Vt., September 10th, 1813. He began the study of medicine while a mere boy, and received his medical degree from the University of Pennsylvania in 1833, when only twenty years old. He first began practice at the place of his nativity, but

soon afterward moved to Auburn, N. Y., where in a short time he obtained a widespread reputation as a surgeon. Five years after he settled in Auburn he was appointed Professor of Surgery in the Fairfield (N. Y.) Medical School; but not liking this place, he shortly thereafter accepted a similar appointment at the Geneva (N. Y.) Medical College, where he remained four years, and thence went to Buffalo, where, in association with the late Dr. Austin Flint, he aided in founding the Medical Department of the University of Buffalo, in which he was Professor of Surgery. Fourteen years subsequently, in 1860, while still retaining his professorship in Buffalo, he moved to Brooklyn, where he had barely settled before he was chosen Professor of Surgery in the Long Island College Hospital. In 1861 he entered the army, and was first attached to the Thirty-first New York Regiment. He was successively promoted to the grade of Brigade Surgeon—the latter after the battle of Bull Run—Corps Surgeon under General Keyes, in 1862, and Medical Inspector of the United States Army, in 1863. Dr. Hamilton was one of the founders of Bellevue Hospital Medical College, and held its chair of surgery until 1875, when he resigned. He has been living and practising in New York City since 1864 to the time of his death.

Dr. Hamilton distinguished himself not only as a skilful surgeon, but as a prolific and leading writer, chiefly on surgical subjects. His famous "Treatise on Fractures and Dislocations," published first in 1860, is justly regarded as the best book on that subject in existence. It has now run through seven editions, and has been translated into French and German. Among his other widely-known works are "Prognosis in Fractures," "Treatise on Military Surgery," "Treatise on the Principles and Practice of Surgery," and "New Views on Provisional Callus." He was also a liberal contributor to medical periodical literature, and the author of a number of papers on medico-legal and sanitary subjects. Notably among the latter are an account of his own practical work in stamping out cholera at Suspension Bridge, N. Y., in July, 1854, published in the New York *Medical Journal*, 1884, p. 533, and "Cholera Stamped Out.—Summary Dealing with Cholera at the Work-house, Blackwell's Island, 1866" (THE

SANITARIAN, Vol. I., p. 199). But the work which Dr. Hamilton himself appears to have regarded with the greatest pride was his "Treatise on the Principles and Practice of Surgery," published in 1872 (the third edition was published a few weeks ago). After he had finished it he remarked one day to his daughter, "Well, now my life is completed."

For many years previous to and at the time of his death he was a member of the leading medical associations of the United States and of the State of New York, in several of which he had been honored with the presidency. He was a man of sterling worth, greatly beloved by those who knew him best, and is a great loss to the medical profession.

LITERARY NOTICES.

SANITATION VERSUS MILITARIANISM and THE SANITATION OF LONDON AND THE SUBURBS, by EDWIN CHADWICK, C.B., are two addresses recently delivered before Sanitary Inspectors' Associations in London, both characterized by that thorough familiarity with practical sanitation common to the author, by reason of which he is so often called upon to open the way to working associations. The first one named pointedly illustrates by contrast the baneful results of maintaining at enormous expense militarianism to the neglect of practical sanitation, by citing the death rates, respectively, before and since the adoption of sanitary measures in prisons, eleemosynary institutions, and military hospitals in England. The health of towns and vilages destitute of sanitary provision are contrasted with those which are so provided, and the mortality rates of cholera in various places before any attention was paid to sanitation, and in the same places since, forcibly illustrate the benefits and economy of sanitation as compared with militarianism everywhere.

The second one dwells more particularly upon filth diseases generally and the means for their prevention—drainage, sewerage, surface cleanliness, and house sanitation.

SURGICAL INJURIES. By R. HARVEY REED, M.D., Mansfield, Ohio.

THE RELATION OF THE STATE AND THE MEDICAL PRO-

FESSION, an address delivered June 30th, 1886, before the Alumni Association of the Department of Medicine and Surgery of the University of Michigan, by CHARLES J. LUNDY, A.M., M.D., Detroit.

TYPHOID-FEVER: ITS CAUSE AND PREVENTION. By J. F. KENNEDY, M.D., Secretary of Iowa State Board of Health. A concise paper of much practical information.

THE SANITARY CONDITIONS AND NECESSITIES OF SCHOOL-HOUSES AND SCHOOL-LIFE, by JAMES F. HIBBERD, M.D., Richmond, Ind., is a pamphlet of twenty-six pages, comprehending a good deal of practical knowledge on an exceedingly important subject, worthy of the attention of all educationists.

MEDICAL EXPERT TESTIMONY AND THE HYPOTHETICAL QUESTION, by WILLIAM C. WEY, M.D., Elmira, N. Y., reprint from the Transactions of the Medical Society of the State of New York, is a pamphlet of twenty-one pages, of interest to all physicians because all are more or less liable to be called upon to face the demands of justice in cases requiring medical knowledge. The weight of the testimony of the medical expert as compared with that of other witnesses is explained in considerable detail, and the usual plan of selecting medical experts rightly condemned. The author favors the selection of experts by the courts, "who," as Professor Reese says, "shall be State officers, physicians of thorough experience and education, and training in this particular line, who shall devote their time and attention exclusively to this duty, and for which they shall receive an adequate compensation." The abuse of the hypothetical question and its fallacies are also clearly explained and illustrated by citations, whereby the exhibits show a travesty of justice rather than an effort to secure it.

SOME POINTS OF INTEREST WITH THE WANKLYN METHOD OF SANITARY WATER ANALYSIS, PARTICULARLY ON THE DETECTION OF RECENT SEWAGE AND THE DETERMINATION OF THE NATURE OF THE ORGANIC MATTER. By CHARLES SMART, Major and Surgeon, U. S. Army. A pamphlet of six pages only, reprinted from *Public Health* in Minnesota, but very terse, analyzing a generally accepted but imper-

fectly understood analysis, and improving upon it. It would be difficult to overestimate the importance of the subject discussed, to which this paper is a valuable contribution, and we earnestly commend it to the attention of all health authorities, while we hope to find room erelong for reprinting it in our pages.

CATARRH OF THE UPPER AIR TRACT, ESPECIALLY ITS EFFECTS ON THE EAR, WITH SUGGESTIONS AS TO TREATMENT, BOTH HYGIENIC AND MEDICAL. By SAMUEL SEXTON, M.D., Aural Surgeon to the New York Eye and Ear Infirmary. Reprint from the *Medical Record.* Pp. 33. New York: J. H. Vail & Co.

This is a brochure of much practical utility, showing the difference in the relation of urban and rural residence, and the phenomena observed in what are designated as two classes of catarrhal disease of common occurrence, and with which all medical practitioners should be familiar. The mental strain, overwork, worry, and dissipations of every kind in city life which give rise to nervous exhaustion and, consequently, mental and physical disability, are the alleged cause of the commonness of the disease under consideration. The allegation carries with it the suggestion of the benefit to be derived from a change to rural residence as a means of treatment and prevention. Some remarkable cases are cited with reference to meteorological influences, also of practical importance as guides in the treatment, change of climate, etc. The influence of food and clothing is also dwelt upon, and the medical and surgical treatment of such cases as require it clearly described.

THE SANITARY VALUE OF THE CHEMICAL ANALYSIS OF POTABLE WATERS, a paper read before the Albany Institute by WILLIS G. TUCKER, M.D., Albany, N. Y. This is an excellent summary of the impurities found in water by various processes of analytical chemists and their significance, with special reference to the Albany water supply and its dangers. Illustrations are cited from English reports, especially showing the relation of cholera and typhoid-fever to water contaminated with sewage, and how such diseases have been abated and prevented by protecting the water supply from pollution.

THE SANITARIAN.

OCTOBER, 1886.

NUMBER 203.

AMERICAN TENEMENT-HOUSES.

By CHARLES F. WINGATE.

THE tenement system is the natural result of the great massing of population in cities. In 1790 one thirtieth of the population of the United States was found in cities, now the number is one fifth in New York State alone. The tenement system has spread to nearly every large city in the Union. The average number of inmates to each house is 6 in Philadelphia, 8⅓ in Boston, 6⅓ in Baltimore, 8 in St. Louis, 8¼ in Chicago, 9 in Brooklyn, and 16 in New York.

Seventy per cent of the total mortality in New York is found in tenements, and the larger share of the deaths of children occur there. The rate of mortality is steadily increasing. The percentage of deaths in New York tenements has increased from 51.11 per cent in tenements in 1870 to 56.50 per cent in 1884.

The first tenement was erected about 1838, in Cherry Street. By 1865 there were 15,309 tenements on Manhattan Island. In 1879 their number had increased to 21,163, and in 1883 to 25,663, including apartment-houses and flats. The average number of inmates in each tenement in 1864 was 35. Many houses contain but 3 or 4 families, and the larger buildings are occupied by from 60 to 100 persons. In the 964 houses inspected in 1884 by the Tenement-house Commission, there were 8811 families and 37,114 persons, or an average of 40 tenants to each house.

Taking as a standard the deaths per annum in each house,

it would seem that 5 per cent of the whole number, which have a yearly mortality of 3 or more deaths per house, must be rated as "very bad," 10 per cent, having 2 deaths per year, would be rated as "bad," and 40 per cent, with 1 death per year, might be called "fair," leaving 45 per cent to be ranked as "good." Tried by the standard of the proportion of air-space and sunlight allotted to each tenant, 10 houses in each 100 would have to be condemned as absolutely unsanitary, while 40 in each 100 would be found deficient in these vital requirements. At the conclusion of the detailed survey made by a special corps of inspectors in 1879, it was reported that 2038 tenement-houses were in bad condition, and 5342 were in a fair sanitary state. In this report 2580 rear tenement-houses were recorded, and as these are usually defective, the above rating of bad tenements must be considered as low.

In PHILADELPHIA thousands of small houses have been erected by building associations, and as Colonel Waring remarks, there is probably no other community where so many working people occupy and sleep in rooms opening directly to the outer air. Nevertheless Philadelphia is deficient in many sanitary features. Owing to its extended area, sewerage facilities have not been generally introduced. Hundreds of householders have to depend upon cesspools and wells, and soil saturation is increasing and is a constant menace to health. And many of the small houses, especially where the occupants are careless and ignorant, exhibit serious defects, notably in the regions around Alaska Street and St. Mary's Lane, where there is a large Italian population. An official inspection by the Board of Health in the Alaska Street district showed in a single block "37 overflowing cesspools, 43 filthy yards, 36 foul cellars, 137 very dirty rooms, 3 filthy stables, and 34 generally unhealthy houses."

During the month of March, 1884, I paid a visit to Philadelphia and inspected the notorious regions around Alaska Street and St. Mary's Lane, where the chief slums of the city are found. The streets are so narrow that two vehicles can scarcely pass, and they are not specially clean. The houses are small, two stories in height, with alley-ways between, through which an open gutter carries the family slops. Even here the characteristic marble steps are seen. The houses are

much better built than the New York tenements, and have the advantage of being small; in other respects they are as crowded, dirty, and unsanitary in all respects as their rivals of the metropolis. As the day was fine most of the doors and windows were filled with the inmates, who were unmistakably of the vicious class. There was less mixture of nationalities than in New York, the Germans seemed to predominate, and here and there was an Italian colony with its excess of dirt and rubbish.

BROOKLYN.—Recently, in company with Dr. Palmer, one of the most experienced sanitary inspectors of Brooklyn, I visited some of the worst sections of the City of Churches with a view to comparing their condition with those of New York. They were situated around South Ferry, and bore the worst reputation. Among the number was the notorious Buckingham Palace, a ramshackle structure with dark halls and many signs of neglect. I also went through the House of Blazes and other typical bad tenements. But nowhere was anything to be seen equal to the worst buildings in New York. Even in the worst houses there was less crowding, more sunlight, better air, and less filthy surroundings. The rents were lower, and there was far less sickness or destitution. In short, my conclusion, as expressed to the doctor, was, "These are palaces compared to the average New York tenements." There were but few large buildings, and the great majority were three-story houses containing six or eight families Many quite decent rooms rented as low as $2.50 or $3, while large, comfortable, airy rooms could be had within three minutes of South Ferry at less than the most squalid rookeries in New York.

Perhaps the worst place we visited was a building occupied mainly as a cheap lodging-house. There were five bedsteads in the rear basement, or, rather, cellar, which accommodated seven persons; the yard was filthy beyond description, the building itself ready to tumble down, and the fire-places in particular were unsafe, yet the landlord refused to give even a quart of mortar to repair them. On the upper floor there were two families each, with numerous children, one of them sick with fever. They were packed very closely, and were in want of everything.

CINCINNATI.—The report of H. G. Hanley, Chief Engineer, for 1882 states that only one sixteenth of the city, or about one and one half square miles of territory, is sewered; about 70,000 of the population are afforded sewer privileges, while the remaining 200,000 have to trust to cesspools and night-carts. There has been a public awakening on the subject, and the State Legislature has been solicited to provide new sewers. The city contains 237 miles of improved streets and alleys, and 203 miles of unimproved streets and alleys. There are six parks, containing 539 acres, which cost $13,202.68 annually. The area of the city is 24 square miles; 19½ million gallons of water are used, at 69 gallons per capita. Until recently the Board of Health comprised five saloon-keepers and one physician.

The accompanying communication from Dr. C. W. Rowland, Health Officer of Cincinnati, was received in reply to special inquiry, February 10th, 1885:

"I think we have here no such houses as are termed 'tenement-houses' with you; but passing by the well-constructed flats occupied by well-to-do people, and the numerous German tenement-houses across the canal or 'Over the Rhine'—the latter all being in good condition—I have examined thirteen of the houses most nearly approaching your tenement-houses, and submit herewith a detailed statement of condition thereof. We have succeeded in securing great improvement in many of these by compelling owners to place *responsible janitors* in charge of them to see that tenants committed no nuisance, that the water supply and water-closets, or privies, are kept in good order, and proper ventilation secured. Our city is divided into about twenty districts, with one sanitary inspector constantly in each; but some of these hard places, being once in order, soon relapse unless we are on their heels constantly. I have sent a special inspector, and he reports just as he found them (the thirteen reported). The worst places are the low dives occupied by black and white prostitutes; some of these are reported in this list. The largest and worst of them are included, and I have issued to the owners an order to clean up *forthwith.* Otherwise our Board will condemn them *as nuisances* and shut them up entirely. If I have failed to answer your inquiries satisfactorily, please command me again."

Report of Sanitary Condition, Number of Occupants, Rents, etc., of Thirteen Tenement-houses in Cincinnati, Ohio.

CINCINNATI, February 10, 1885.

1. Spencer House, an old hotel, well constructed, but no longer used as a hotel. Corner Front and Broadway. This house has 187 rooms, halls 10 feet wide, sewer connection, good water-closets. Occupied by 62 families, who pay from $3 to $8 per room per month. The house is kept well cleaned and ventilated. All sanitary conditions good.

2. The old Broadway Hotel, corner Broadway and Second, now used as a tenement-house. This house formerly gave us great trouble to keep in order, especially when occupied by Russian Jews. It has lately been renovated and a good janitor in charge. There are 80 rooms, occupied by 33 families, who pay $3 to $8 for each room monthly. This has no sewer connection, using privies; but the sanitary conditions are good.

3. House on north-east corner Third and Sycamore. Forty-eight rooms, occupied by 27 families. Rent of rooms, $2 to $4 per month. The sanitary conditions only tolerable, but better than formerly.

4. Manchester Building, south-west corner Third and Sycamore. Much better building than one opposite (3), with 48 rooms and 35 families. Rent, $3 to $8 per room monthly. Has sewer connection, and is in fair sanitary condition. Formerly gave us great trouble to keep straight, but a thorough cleaning up and the presence of a good janitor have effected a remedy.

5. Wade Barracks, south-east corner Plum and Wade. Fifty-six rooms, 31 families, paying $3 to $4 per month for rooms. Sanitary conditions good. No sewer connections.

6. House south-east corner Front and Ludlow. Fifteen rooms, 6 families, $3 to $5 monthly rent paid. No sewer connections. Sanitary conditions good.

7. House No. 30 Goodloe Street. Twenty-seven *so-called rooms*, occupied by 15 families, paying rent of $1 per room per month. This was an old church, divided off into rooms by board partitions. *Sanitary conditions bad.* Owner ordered to fix up *forthwith!*

8. House No. 91 East Front, known as "Picketts" (a colored man, who rents the rooms to black and white prosti-

tutes promiscuously at $2 *each per week*). House has 21 rooms. Has sewer connection, but is *in very bad sanitary condition.* We have to make owner overhaul this house several times a year, and have now issued a peremptory order to him. *A most miserable and degraded set of occupants and frequenters!*

9. House south-west corner Front and Ludlow. Twenty-one rooms, occupied by 6 families and several prostitutes, black and white, paying $3 to $5 per month. We will endeavor to get the families out of there, as the surroundings as to morals and sanitary condition are vile indeed. Have to overhaul this concern frequently and threaten to close it up, and will do so unless owner keeps in better condition.

10. House No. 74 East Seventh Street. Sixteen rooms, 14 families. Rent, $3 per month. This is a miserable, dirty hole, and we will have it cleaned up or abandoned.

11. House No. 113 East Sixth Street. Fifty-two rooms, 23 families. Rent, $3 to $4 *per month.* Has sewer connection, and is in good sanitary condition.

12. House No. 99 East Sixth, formerly a church. Twenty-four rooms, 17 families. Rents, $3 per month. Poor sanitary condition. Occupants all colored.

13. Empire Hall Building, north side Sixth, between Smith and Mound. Thirty-six rooms—3 floors—occupied by 18 families—96 persons. Rent, $7 to $14 per month, average about $10. Sanitary conditions not the best. Difficult to secure proper ventilation.

ST. LOUIS, until recently, had no houses planned for more than one family. The German population occupy what are popularly known as "Dutch houses" of two stories, intended for one family on a floor, the upper floor being reached by outside stairs at the rear. Recently flats have begun to be erected, and their ill effects are already apparent. Dr. Robinson, a dispensary physician, in his report for 1880 said: "Crowded and illy-ventilated tenement-houses, where the battle for life has made the inmates forgetful of cleanliness, furnish the larger part of our cases, and make the work of curing a difficult one."

C. E. Illsley, a leading architect, sends the following regarding St. Louis tenements: "The tenement-house system (in

the shape it has taken in New York) is almost unknown here. A certain class of people is everywhere 'forgetful of cleanliness,' even when their hovel home is the sole adornment of a boundless prairie. It is not always chargeable to overcrowding."

In another communication the same writer says: "I now mail to you a copy of the last report of our Health Commissioner, which, I fear, will give you very little useful information as to tenements, however, and I send a few items gathered from interviews with various officers of the department.

"A force of eight so-called sanitary inspectors was employed for about nine months of last year in making a sanitary investigation of certain crowded and unhealthy districts. In one case a population of 1120 persons was reported in one square, or block, and in another case 1824. These blocks are of more than the average size, however, probably 700 feet long by 350 feet wide. One block contained 541 inhabitants, another 534; perhaps half a dozen more had populations of about 400 each, and another half dozen blocks might have 300 souls each. About 100,000 square feet to a block would probably = average area. One house of 24 rooms has 25 families. There are three or four houses somewhat notorious from overcrowding and the low character of tenants. These houses generally consist of a two or three-story building facing a street 60 feet wide, and ells or extensions facing small yards. There are a good many two-story houses and a few three-story ones built facing alleys 15 to 20 feet wide.

"There is but one distinctively tenement-house building, the Whittier Building, four stories high, and having, I presume, some 40 rooms (I have never counted them). This building is fairly well designed and built, well lighted and ventilated, under care of resident janitor, and appears as clean as is possible, probably, with that class of tenants.

"The crowding is chiefly in portions of the city which have become forsaken by the development of business in other quarters, and where stores and dwellings once well designed and built are filled up by a low class of occupants, white and colored, who would huddle together if they had a ten-acre lot to circulate in, and whose filthy living is a matter of preference quite as much as of necessity.

"The sanitary inspectors noted the number of tenants to each building and in each block, the condition of rooms, yards, alleys, water-closets, and nature of water supply. In the great majority of cases the report for each of these items was '*good.*' Sometimes an ash heap, occasionally a damp cellar, and a few wells were noted.

"I think there are very few cases where the crowding of people is at all necessary, except from extreme poverty. Even then, in a great many cases, rent is saved only to be spent in liquor.

"Very respectfully yours,

"C. E. ILLSLEY."

WASHINGTON, D. C.—The following communication was received from Major S. A. Robinson, Plumbing Inspector of the city of Washington, under date of December 17th, 1884:

"I take pleasure in saying that the workingmen's houses in this city are mostly small, four-room brick houses, all supplied with proper drainage, plumbing fixtures, and ventilation. The same care is taken with these as with the most costly dwellings, and the requirements of the building regulations, as well as the regulations governing plumbing and house drainage, are strictly complied with. The old frame shanties on the outskirts of the city are fast disappearing, as all houses here are required to be connected with the public sewer. There are no large tenements here for the working classes."

In a paper on "Hygiene of the Habitations of the Poor," read before the American Public Health Association, St. Louis, Mo., October 14th, 1884, the same gentleman remarks:

"If we consider the dwellings of the poor in my own city of Washington, we will find small houses, usually occupied by a single family. Houses of recent construction, though not generally secured from the noxious air rising from the soil, and otherwise cheaply built, are all provided with separate and secure drains of heavy cast-iron, amply ventilated and trapped from the public sewers. Houses in the outskirts of the city, of earlier construction, are generally unprovided with drains, privy boxes being in common use. Where ground is cheap and plenty, as in Washington, this system of separate tenants will fortunately continue the rule, and secure construction becomes very simple."

In PITTSBURG few artisans own their own houses. On the south side, where mills are numerous, there are long rows of single tenements, each containing three rooms and a basement kitchen. In other localities five or six families will be found in one tenement. A prominent clergyman of Pittsburg, in an address before the Presbyterian Ministers' Association of that city, declared that in proportion to its population Pittsburg is as bad as any of her sister cities in the means for the housing of her poor. During a visit to the East End of London he had seen no more sad and uninspiring scenes than in the tenement-houses of Pittsburg. The houses are wedged in so closely that there is but little breathing room, and there is a perfect tangle of narrow alleys and courts. The larger tenements were even worse than the converted dwellings.

Mr. Joseph D. Weeks, in a communication dated October 9th, 1885, says: "As a rule, the houses of workingmen in Pittsburg are about as bad as they can be. We are so cramped for room in the neighborhood of our manufactories, in and near the city proper, by reason of the bluffs on both the Allegheny and Monongahela rivers closing us in, that space is very valuable, and the houses of the operatives neither have that space around them which is desirable, nor, by reason of the smoke, have they that pure air and cleanliness which conduces not only to health, but to the highest self-respect."

BOSTON.—Mr. Robert Treat Paine, President of the Associate Charities of Boston, under date of August 4th, 1884, writes as follows: "Boston will certainly watch with deep interest the results of your New York Commission on Tenement-houses.

"The problem before you lies at the root of the worst evils of our poorest and most wretched classes.

"Charity is working in countless ways to relieve suffering and to ameliorate the lot of the poor, as well as to reform the vicious; but I often think all these efforts are utterly vain to stem the growing tide of crime and destitution which comes from the terrible overcrowding of the poorest classes in the vilest tenements. Modesty is lost, chastity is almost impossible, temperance can hardly exist where the two sexes of all ages are herded together, as is so often the case. Human nature seems to be such that even the vilest abodes will always

be tenanted, if the law allows; and this, too, even where disease is sure to ruin health.

"You cannot raise the condition of the poorer classes above the circumstances in which they live. These circumstances may often drag wretched tenants down hopelessly.

"The greatest problem of modern civilization is whether it is possible to have the wealth and splendor and culture of our great cities without also having the opposite extremes of squalor and degradation among large masses, and in such sad shape as to go on with increasing momentum among increasing numbers.

"Civilization will be a failure if this result shall follow. Yet it is absolutely sure to follow if multitudes of the orderly poor are permitted to herd in vile tenements, to the ruin of health, hope, and virtue.

"I do not now think of any publications in Boston to aid you. Our work in the Associated Charities brings our visitors in contact with much wretchedness of life and character, and vigorous efforts are always made, and the city Board of Health is always ready to do all in their power to have unfit tenements made decently habitable. It is an eternal war. Of course Boston has not the vast tenement-houses and aggregations of very poor which makes the most difficult part of your New York problem. Land is still unoccupied and cheap with us, so that our laboring classes are moving, sometimes driven, out into fresh quarters of the city.

"Permit me to express the conviction that your commission may exact a lasting and potent influence for good on New York, and also in the other cities and towns of our country, if you can demonstrate by *facts*, so that there can be no contradicting them, that tenement-house life, in its vilest forms of overcrowding, saps the health, the morals, and depraves the character of the occupants; and therefore needs the vigilant supervision of the health officers

"1. To prevent overcrowding, and make sure that no room or rooms are tenanted by more than a reasonable number of occupants.

"2. To make sure that damp and foul cellars and basements are absolutely vacated.

"3. To insist on sufficient sunlight and air and ventilation.

"4. Also cleanliness and purity.

"5. And decent conveniences of water-closet or privy in proportion to number of tenants.

"Firmly convinced that these reforms are of imperative necessity in all our cities, and especially in New York, and that they will be an inestimable blessing to the poorest classes, I give you my best wishes in your important work."

NEW HAVEN.—Dr. Linsley has furnished the following information regarding workingmen's homes in New Haven, under date of April 11th, 1885: "I am not aware that there is any fixed or legal definition of 'workingmen,' but I suppose you refer to those who do manual labor for their daily living. But that includes the skilled mechanic with the common laborer, and so I think you probably have reference only to the latter class.

"There has been no attempt to collect any definite facts in regard to their 'homes' that I know of, and therefore I can only give you my impressions about them in the most general way. The laborers in New Haven are almost exclusively foreigners or the sons of foreigners. Their wages are, I suppose, about the same as in other cities—viz.: $1 to $1.50 per day. Their homes are synonymous with the 'tenement-houses' of the place—*i.e.*, the tenement houses of the poorer class. We have as yet very few really very bad 'tenements' in New Haven. The worst are occupied by Italians. The Irish laborers are most numerous, and rents in New Haven are low enough to enable a family to occupy from two to four rooms, according to the number. Except among a few Italian nests, I think you could seldom find a family with children living in a single room.

"The six-family house is very popular in the Irish districts. It is three stories high, with a cellar divided into parts for the storage of fuel for each tenant. The end of the building is toward the street, and the entrance upon the side. Every room has one window or more, and the whole house is surrounded by an air space of four feet or more.

"The chief sanitary defects are due to the slovenly habits of the tenants, and to the fact that in many parts of the city the cesspools and privy vaults are still in use.

"Extreme overcrowding is rare. I believe New Haven will compare favorably as regards its tenement-houses with other cities of its size."

TYROTOXICON ; ITS PRESENCE IN POISONOUS ICE-CREAM ; ITS DEVELOPMENT IN MILK ; AND ITS PROBABLE RELATION TO CHOLERA INFANTUM AND KINDRED DISEASES.*

By VICTOR C. VAUGHAN, M.D., Ph.D., Professor of Physiological Chemistry in the University of Michigan, Member of the State Board of Health.

ABOUT one year ago, and after two years of close investigation, the writer succeeded in isolating from some samples of cheese, which had produced alarming symptoms in many persons, a highly poisonous ptomaine, to which the name tyrotoxicon (cheese poison) was given. The effects of this poison were demonstrated repeatedly upon some of my students, who kindly offered themselves as subjects of experimentation, and upon myself. These were found to agree closely with those observed by the physicians who treated the persons made sick by eating of the cheese. There were reported to the Michigan State Board of Health about 300 cases. The most prominent symptoms were dryness and constriction of the fauces, nausea, retching, vomiting, and purging.

The vomited matter was frothy and the stools watery. In some there were evidences of marked nervous depression. Although in many the condition seemed alarming, all finally recovered.

A report of the discovery of tyrotoxicon in cheese will be found in *Zeitschrift für physiologische Chemie*, B. X, Heft 2 ; also in the Annual Report of the Michigan State Board of Health, for the year 1885.

Last November a student brought to me a four-ounce bottle partly filled with milk which had stood tightly closed with a glass stopper for about six months. From this I succeeded in isolating the same poison. It was recognized by its crystalline appearance and by its effect upon myself. It was presumed

* Read at the quarterly meeting of the Michigan State Board of Health, Lansing, July 13th, 1886.

that this milk was normal in composition when first obtained; but of this we could not be certain.

I then put several gallons of normal milk in perfectly clean bottles with glass stoppers and allowed these to stand in my work-room. From time to time a bottle was opened and the test for tyrotoxicon was made. These tests were followed by negative results, until about three months after the experiment was begun. I then succeeded in getting the poison from one of the bottles. The method of testing for it was as follows: The coagulated milk was filtered through heavy Swedish filter paper. The filtrate was colorless and decidedly acid in reaction. It was rendered feebly alkaline by the addition of potassium hydrate, then agitated with ether. After separation the ethereal layer was removed with a pipette, allowed to run through a dry filter paper to remove a flocculent, white substance which floated in it, and then allowed to evaporate spontaneously. If necessary this residue was dissolved in water and again extracted with ether. On the evaporation of the ether the tyrotoxicon was recognized by its crystalline appearance, by its odor, and by placing a small bit on the tongue. As the ether takes up some water, there is usually enough of the latter left after the spontaneous evaporation of the ether to hold the poison in solution, and in order to obtain the crystals this aqueous solution must be allowed to stand for some hours in vacuo over sulphuric acid.

From one half gallon of the milk there was obtained quite a concentrated aqueous solution of the poison after the spontaneous evaporation of the ether. Ten drops of this solution placed in the mouth of a small dog three weeks old caused, within a few minutes, frothing at the mouth, retching, the vomiting of frothy fluid, muscular spasm over the abdomen, and after some hours watery stools. The next day the dog seemed to have partially recovered, but was unable to retain any food. This condition continuing for two or three days, the animal was killed with chloroform. No examination of the stomach was made.

It may be remarked here that I have elsewhere pointed out the necessity of using pure ether for these extractions, as some samples of ether contain an irritating, ptomaine-like substance.

June 13th, 1886, I received from Dr. Henry B. Baker, Secretary of the Michigan State Board of Health, a pint bottle about two thirds full of melted ice-cream, with the request that I analyze it, as some eighteen persons had been seriously affected by eating of it. Dr. Baker also sent some of the vanilla which had been used as flavoring. It was thought that the poison would be found in the vanilla, because some lemon ice-cream furnished at the same gathering had not affected those who ate of it. As the readiest means of deciding this my assistant, Mr. Novie, and myself took at first thirty drops each of the vanilla extract. No ill effects following this, Mr. Novie took two teaspoonfuls more, with no results. This settled the question of the poisonous nature of the vanilla more satisfactorily than could have been done by a chemical analysis.

We then added some distilled water to the cream and, after thorough agitation, filtered it. The filtrate was tested for tyrotoxicon by the method already given. The aqueous solution, after the spontaneous evaporation of the ether, was given to a cat. Within ten minutes the cat began to retch, and soon it vomited. This retching and vomiting continued for two hours, during which time the animal was under observation, and the next morning it was observed that it had passed several watery stools. After this, although the cat could walk about the room, it was unable to retain any food. Several times it was observed to lap a little milk, but on doing so it would immediately begin to retch and vomit. Even cold water produced this effect. This condition continuing, after three days the animal was placed under ether and its abdominal organs examined. We certainly expected to find marked inflammation of the stomach. But we really did find the stomach and small intestines filled with a frothy, serous fluid, such as had formed the vomited matter, and the mucous membrance very white and soft. There was not the slightest redness anywhere. The liver and other abdominal organs seemed to be normal.

It should be remarked that this cat was about two months old. Attention is called to this because young animals are affected by this poison much more readily than older ones. It requires a comparatively large amount of the poison to cause any marked symptoms in an old cat.

After having made these experiments I received from Dr. R. C. Moffitt, of Lawton, Mich., the following letter:

"LAWTON, MICH., June 21, 1886.

"DEAR DOCTOR: I understand from Professor Charles Lawton, of this place, that the cream sent to Lansing for examination has been forwarded to you, so I write to give you the particulars. About two hours after eating the cream every one was taken with severe vomiting, and after from one to six hours later with purging. The vomit was of a soapy character, and the stools watery and frothy. There was some griping of the stomach and abdomen, with severe occipital headache, excruciating back-ache and 'bone' pains all over, especially marked in the extremities. The vomiting lasted from two to three hours, then gradually subsided, and everybody felt stretchy, and yawned in spite of all resistance. The throats of all were œdematous. One or two were stupefied; others were cold and experienced some muscular spasms. A numb feeling, with dizziness and momentary loss of consciousness, was complained of by some. Temperature was normal, and pulse from 90 to 120. Tongue dry and chapped. All were thirsty after the vomiting subsided, and called for cold water, which was allowed in small quantities, with no bad results. After getting out no one of the victims was able to be in the hot sun for several days, and even yet (about ten days after the poisoning) the heat affects myself. I attended twelve persons, besides being sick myself, and all were affected in pretty much the same way. Several complain yet of inability to retain food on the stomach without distressing them. The man who made the cream took a teaspoonful of it, and he vomited the same as those who ate a whole dish, but not so often nor for so long a time. All are affected with an irresistible desire to sleep, which can scarcely be overcome. Even yet, some of us feel that drowsy condition, with occasional occipital headache. Yours fraternally,

"R. C. MOFFITT, M.D."

It will be seen from the above that the symptoms produced in the persons agree closely with those observed in the cat. Cases of poisoning from ice-cream are by no means rare, and I hope that those who have the opportunity will not fail to test for tyrotoxicon. In the report of the Brooklyn Board of Health for 1885, an instance is given of the poisoning of more than one hundred persons from ice-cream sent out from one restaurant. The chemist was unable to detect any mineral poison. The injurious results were attributed to the use of decomposed gelatin; but no gelatin of any kind was used in

the Lawton cream. Other cases occurring in New York and Brooklyn have been attributed to the employment of artificially prepared vanilline for flavoring; but the vanilla extract used in the Lawton cream was not poisonous, as has been shown.

As I write this I notice in the daily papers the report of the fearful poisoning from ice-cream near Leamington, N. J. The papers state that the poisonous substance is arsenic, but how this has been determined is not given. I suppose that arsenic has been named from the symptoms. If it be true that the cream was made from milk brought in by the quart or gallon, by those participating in the festivities, the chance of mixing some milk containing the germ, which must produce the poison, with the good and thus contaminating the whole, was as favorable as it could well be. Of course, if a chemical analysis shows the presence of arsenic, the question is settled; but in all similar instances chemical analysis has demonstrated the absence of mineral poisons.

The circumstances under which tyrotoxicon develops require farther study. As has been shown above, it may develop in normal milk, kept in a clean bottle for three months; but it is evident that in some instances it appears much earlier. The production of the ptomaine is, in all probability, due either directly or indirectly to the growth of some micro-organism. In the cheese Dr. Sternberg found a new micrococcus; but whether or not there is any relation between this organism and the poison remains to be determined. In the cheese, milk, and cream, in all of which I have found the poison, there was present more or less butyric acid, and it may be that there is some intimate relation between butyric acid fermentation and the production of the poison. Some years ago Selmi obtained a ptomaine which resembles coniine, and pointed out that it might be formed by the action of butyric acid on ammonia, thus:

$$\underset{\text{(Butyric Acid.)}}{2C_4H_8O_2} + \underset{\text{(Ammonia.)}}{NH_3} - 2H_2O = \underset{\text{(Coniine.)}}{C_8H_{15}N}.$$

or thus: $2C_4H_8O_2 + NH_3 + 2H - 4H_2O = C_8H_{15}N.$

In like manner other fatty acids may react with decomposing nitrogenous substances, forming alkaloidal bodies. Tyrotoxicon has no special resemblance, so far as is known, with coniine, but the possibility of these alkaloidal substances being

formed in this way is worthy of mention. T. Lauder Brunton, in referring to the writer's discovery of tyrotoxicon, states that from the action of the substance he would infer the presence of two poisons. This is altogether possible. The writer has not been able to obtain the poison, as yet, in quantities sufficient to enable him to make an ultimate analysis of it. But that it is a chemical body produced by fermentation there can be no doubt.

If there be any doubt about the poison being produced by fermentation, the following experiment would seem to clear it up.

June 26th I took two samples, of one pint each, from a bottle of milk which had already undergone the lactic acid fermentation. These samples were placed in clean glass graduates. To one, a piece of the solid portion of the poisonous custard, about the size of a filbert, and which had been washed with distilled water, was added. To the other no addition was made. These samples stood side by side for forty-eight hours. Both were then tested for tyrotoxicon. The one to which no addition was made gave no crystals, no odor, and when given to a cat produced no effect. The one to which the addition had been made yielded crystals which had the odor of tyrotoxicon, and which, when given to a very large old cat, produced frothing at the mouth and retching, but no vomiting or diarrhœa, and the next day the animal was able to eat food and seemed to have recovered. I am quite certain that had this been administered to a young animal the result would have been more marked.

It is well known that milk, while undergoing the lactic acid fermentation, does not possess any such poisonous properties as those belonging to tyrotoxicon. There is no evidence, then, that the poison is connected in any way with the ordinary decomposition of milk. The following extracts from a letter just received from the maker of the Lawton cream shows that the attention given to the milk and vessels was all that could be desired :

"The milk of which the cream was made was fresh and sweet morning's milk, only reserving with it the cream of the milk of the night before from the same cows. The milk is kept in a cool, clean milk-cellar. The custard was made about

noon that day, and immediately afterward the process of freezing was begun. The vessels were all thoroughly cleaned. There was no possibility of any impurities adhering to them, for they were scalded, wiped, and dried before being used. The only ingredients used were the milk, cream, eggs, sugar (best granulated), and the flavoring.

"The lemon cream was frozen first, then taken out, put into the packers, and packed solid with ice and salt. Then the vanilla cream was frozen in the same manner. I used the best Jennings's extract, about the usual quantity, not in excess. The cream was eaten in the evening by many people of the village. All of those who ate of the vanilla cream were made sick, and none of those who ate of the lemon cream suffered any inconvenience.

"Now, the milk was the same in both, milked from the same cows the same morning that the cream was made, so that there was no difference in the custard used in making the vanilla cream and the lemon cream, but it turned out that the one made people sick and the other did not.

"We have continued making cream since in the same manner without the least change of the ingredients or the apparatus, except we have not used vanilla extract, but lemon and pine-apple, and it has been freely eaten and no one has been made sick by it.

"Clearly in my mind the milk does not account for the trouble. One thing further: of course the cream which you examined has been made since the ninth day of June, and may have undergone changes which would result in generating the poison referred to in the papers [certain newspaper accounts of the finding of the poison], and which would not have been found in the cream had it been examined when fresh.

"If there is anything farther that I can furnish you in regard to facts or circumstances in connection with this ice-cream, I will be willing at any and all times to give the fullest information possible. Hoping to receive the correct analysis soon, I remain yours, respectfully, J. W. JOHNSON."

That the poison which I found in the cream was the same as that which affected the people cannot be doubted after comparing the symptoms produced in the cat with those observed by Dr. Moffitt, and, as has been stated, the experiment on the cat was made before I received the letter from Dr. Moffitt. The cream was made on the 9th of June, and the poison separated on the 14th.

I wrote to Mr. Johnson asking several questions, which he

has kindly and fully answered. As the nature of the questions is shown in the answers, I will simply give the answers :

"(1) The milk from all the cows was mixed together in the making of the custard."

"(2) The custard for the lemon and vanilla was all one custard ; made and mixed before the extracts were put in."

"(3) We had previously used the same brands of extracts (Jennings's best), both lemon and vanilla, with no bad results."

"(4) The food of the cows in the morning and evening consists of oats and corn, ground together and fed dry, with clover hay. I have never seen anything suspicious in the pasture or food. There is a running stream of water, coming from a spring, in the pasture. There is plenty of shade. At evening the cows are driven from the pasture and placed in the stable or yard, according to the season. The stable and yard are open for inspection at any time. My residence is in the centre of the village, and the Board of Health would not allow me to stable and yard my cows there if there were any bad odors during the summer."

"(6) The teats are thoroughly washed before each milking."

After receiving the above details concerning the making of the cream, the following experiment was made :

July 8th.—To one quart of night's milk a piece of the solid portion of the Lawton cream, about the size of a filbert, was added. This residue had been left in the filter paper ever since the analysis of the poisonous cream, June 14th, and it was on June 8th that the first milk for the preparation of the Lawton cream was collected. This dried and hardened lump was crumbled into the milk, which was placed in a clean tin pan and set in a cool cellar. July 9th, to a quart of morning's milk, another small bit of the infected material was added, and this milk was also placed in the cellar. At 1 P.M. both portions of milk were poured into a clean earthenware jar, and four fresh eggs beaten, and one pint of granulated sugar was added. The whole was thoroughly agitated, then allowed to stand at the temperature of the room until 4 P.M., when it was placed in the ice-box of a refrigerator, surrounded by ice and here kept until 7 A.M. the next morning, July 10th. Then three ounces of the custard was stirred up with distilled water,

filtered, the filtrate rendered alkaline and agitated with ether. The residue on the evaporation of the ether was dissolved in a little water and given to a kitten about two months old. Immediately the kitten manifested the symptoms of poisoning by tyrotoxicon, which have already been described. I began the analysis of this custard in the morning before having my breakfast, and getting a little on my finger in carrying the jar, I tasted of it. Within a very few minutes I was nauseated, and ten minutes after taking it I vomited. The prompt action of so small a quantity was probably due to the condition of my stomach. At 2 P.M. of the same day I took one teaspoonful of the custard. Within thirty minutes there was marked nausea and some violent retching, but no vomiting. At 3 P.M. the symptoms having abated, I took a tablespoonful more of the custard. At about 3.30 I began to vomit freely. The nausea continued for about an hour. After this there would be passing sensations of sickness. At 8 P.M., while visiting a patient, I was taken very suddenly and sharply with nausea and griping pains in the abdomen. I again vomited and had one watery stool. After this there was no farther trouble. The occipital headache, mentioned by Dr. Moffitt in his letter, was very marked for some hours after taking the custard. It consisted of sharp, lancinating pains which were confined wholly to the occiput. The nausea was peculiar. I cannot say that there was pain in the stomach. A sickening taste would be felt in the mouth and a peculiar, very sickening odor, which I recognized as that of the isolated poison, would intensify the nausea. The throat and mouth seemed filled with a sticky, tenacious mucus. In short, the effects on these parts resembled those which I have experienced from an overdose of atropia.

I think that this experiment explains the poisonous nature of the vanilla cream. The fermentation going on in the custard, and probably begun in the milk, was arrested in that part flavored with lemon by the freezing which was begun immediately. But while the lemon cream was being frozen that part of the custard which was to be made into vanilla cream continued to ferment, and before the freezing process was begun enough of the poison was generated to seriously affect those eating of it.

It should be remarked that in the custard which I made there was nothing peculiar in the taste. It was sweet and pleasant. But while it was not at all acid to the taste, it gave a decidedly acid reaction as tested by litmus, and was not amphoteric in reaction, as cow's milk frequently is.

It is possible that the presence of the large amount of albumen in the custard, from the eggs, hastened the fermentation. I believe that makers of cheese have found by experience that a large amount of albumen in cheese renders decomposition more easy.

How the special germ which produces the poison found its way into the Lawton cream I cannot say; but that it was either present in the milk or was contained in the eggs used, I think cannot now be doubted.

TYROTOXICON AND CHOLERA INFANTUM.

I desire to call attention to the great similarity between symptoms of poisoning by tyrotoxicon and those of cholera infantum. I am aware of the fact that the term "cholera infantum" is used by many in referring to almost any summer diarrhœa of children; but restricting the term to the violent choleraic diarrhœa, as is done by Smith and other best authorities on the subject, we shall find its similarity to poisoning by tyrotoxicon very marked.

The suddenness and violence of the attack, the nausea and vomiting without marked tenderness of the abdomen, the character of the stools, the great thirst, the severe pain in the back of the head, the nervous prostration, and the tendency to deep sleep, are all observed in both. Again, the white, soggy appearance of the mucous membrane of the stomach of the cat corresponds exactly with observations in children after death from cholera infantum. Cholera infantum, as is stated by Smith, "is a disease of the summer months; and, with exceptional cases, of the cities." Thus, the disease occurs at a time when decomposition of milk takes place most readily. It occurs at places where absolutely fresh milk often cannot be obtained. It is most prevalent among classes of people whose surroundings are most favorable to fermentative changes. It is most certainly fatal at an age when there is the greatest dependence upon milk as a food, and when, on

account of the rapid development of intestinal follicles, there is the greatest susceptibility to the action of an irritant poison, and when irritative and nervous fevers are most easily induced. If all these facts be taken into consideration, along with the experiments which have been detailed, and which show the readiness with which the poison can be generated, it will certainly seem at least probable to any one that tyrotoxicon may be a cause of cholera infantum. A little dried milk formed along the seam of a tin pail, or a rubber nipple, tube, or nursing-bottle not thoroughly cleansed, may be the means of generating, in a large quantity of milk, enough of the poison to render it highly harmful to children. The high temperature observed in children with cholera infantum, and which has not been observed in adults poisoned by tyrotoxicon, may be caused by the continued production of the poison in the child's intestine, by the continued administration of milk, and by the greater susceptibility of the sympathetic nervous system in children.

If this causal relation does not exist between tyrotoxicon and cholera infantum, a knowledge of it will aid us, not only in the preventive, but in the curative, treatment of the disease. The first thing to do in the treatment of the disease is to absolutely prohibit the further administration of milk, either good or bad, because the fermentation going on in the intestine would simply be fed by the giving of more milk, even if that milk be of unquestionable purity. I would suggest that some meat or rice preparation be used for food, though experience will soon give us valuable information on this point.

A germ which forms a poisonous ptomaine by its growth in milk may be wholly harmless when placed in a meat or rice preparation.

Secondly, mild antacids should be administered, because the poison, so far as our information goes, is produced only in acid solutions. The great value of the chalk mixture in the treatment of the disease is well known.

Thirdly, theoretically at least, the employment of small doses of some disinfectant would be of benefit. I find that there is considerable difference of opinion in the profession as to the use of small doses of calomel in this disease.

Fourthly, the use of opium in some form is consistent with the theory.

And lastly, the administration of stimulants, brandy and ammonia, to counteract the depressing effects of the poison, already formed and absorbed, should be practised.

All of these, save the first recommendation, have been practised in the treatment of the disease empirically; but the first—absolute discontinuance of the use of milk—I regard as of prime importance.

Of course, it will be understood that attention to securing fresh air, and to other hygienic measures, is also desirable.

It is altogether probable that an amount of the poison which would escape chemical detection might be sufficient to produce poisonous effects in children.

ANN ARBOR, July 12, 1886.

MILK.—"The lowest specific gravity of milk, at a temperature of 60° F., is 1.029. . . . The specific gravity of milk is simply its weight compared with water, and alone gives no indication of its quality, being dependent upon two constituents—namely, the solids-not-fat and the fat. The former raises the gravity above that of water, while the latter lowers it. This explains the reason of skimmed milk indicating higher on the lactometer than whole milk, and this fact is used by those ignorant of what this instrument really indicates to base the claim that it is valueless. It is so, in the hands of one incompetent, but when used by one who understands what causes the fluctuations, and who has more or less practical knowledge of the physical appearances of milk, it is seldom that he cannot tell pure milk from that which has been either skimmed or watered. . . .

"The popular idea that the night's milk is richer than the morning's has been demonstrated to be true.

"The detection of impure water added to milk is known by the presence of nitrites, determinable by the same methods employed in water analysis (quoted from Waller and Martin), as follows: 300 c.c. of milk are to be coagulated with acetic acid and filtered; to 100 c.c. of the filtrate are added about 10 c.c. of a mixture of a solution of equal parts of sulphanilic

acid and sulphate of napthylamine. Now, should the milk contain nitrites, or, in other words, water contaminated with sewage, a rose-red color will commence to form, deepening in intensity on standing, and the deeper the color the more the nitrites present. I have tried this test on milk which I knew to be pure with negative results, and have detected the presence of nitrites in milk to which one part in a million had been added."—*Annual Report of William K. Newton, M.D., Milk Inspector of New Jersey*, 1885.

TEA.

THE quantity of tea exported from producing countries last year, according to recent statistical estimates, was 350,000,000 pounds. And of this amount the British race is not only by great odds the largest consumer, but is fast becoming, if it is not indeed already, the largest producer in the world. In Great Britain the consumption is now 4.90 lbs. per head, while the 3,000,000 of the Australian colonies, New Zealand, and Tasmania, taken together, use over 7½ lbs. per head. The more Australia is peopled, therefore, the better for tea-growers. Even in Canada and Newfoundland the consumption is equal to 4¼ lbs. per head, against only 1.30 lbs. in the United States. Of continental countries Holland alone consumes over 1 lb. of tea per head, the figure being 1.05, while Russia, with all that we have heard of her constant tea-drinking, uses only 0.61 per head. In the Cape Colony and Natal they are not yet much ahead of Russia, and as for other countries of any importance in the world, the figures go down from 0.76 lb. per head in Denmark, to 1-100th of a pound per head in chocolate-loving Spain!

Summed up, of the whole 350,000,000 lbs. consumed, the annual consumption by different countries, and the average consumption per head, is as follows: Australian Colonies, 18,018,000 lbs., 7.66 lbs. per head; New Zealand, 3,902,000 lbs., 7.23 lbs. per head; Great Britain, 178,655,000 lbs., 4.90 lbs. per head; Newfoundland, 824,000 lbs., 4.38 lbs. per head; Canada, 16,600,000 lbs., 3.69 lbs. per head; Tasmania, 389,250 lbs., 3.04 lbs. per head; various British possessions,

about 3,930,000 lbs., 1.66 lbs. per head ; United States, about 65,000,000 lbs., 1.30 lbs. per head ; Holland, 4,382,500 lbs., 1.05 lbs. per head ; Cape Colony, 1,128,500 lbs., 0.90 lb. per head ; Natal, 327,300 lbs., 0.76 lb. per head ; Russia, 62,408,-500 lbs., 0.61 lb. per head ; Denmark, 746,000 lbs., 0.37 lb. per head ; Argentine Republic, 900,000 lbs., 0.30 lb. per head ; Persia, about 1,043,000 lbs., 0.13 lb. per head ; Portugal, 561,000 lbs., 0.12 lb. per head ; Switzerland, about 292,000 lbs., 0.10 lb. per head ; Norway, 170,400 lbs., 0.09 lb. per head ; Germany, 3,113,500 lbs., 0.07 lb. per head ; Morocco, about 354,000 lbs., 0.06 lb. per head ; Belgium, 203,000 lbs., 0.03 lb. per head ; Sweden, about 139,250 lbs., 0.03 lb. per head ; Austria-Hungary, about 739,500 lbs., 0.02 lb. per head ; Spain, 136,000 lbs., 0.01 lb. per head.

Of the production, Ceylon is fast becoming the leading source. According to recent statistics published in the *Tropical Agriculturist*, drawing a comparison between Ceylon and Java, it appears that, while the exports from Java have been nearly stationary for ten years, beginning with 4,808,000 lbs. in 1875, rising to 6,159,000 in 1878, and sinking again to 5,590,000 in 1884, the exports from Ceylon have risen in half the time from a little over 114,000 lbs. in 1880 to 4,352,895 in 1884. With some variations the price of Ceylon tea has also risen during the six years from 11d. to 1s. 3¼d. per lb. It is remarked by Messrs. Gow, Stanton & Co., who are leading exporters in Ceylon, that :

" It is indeed a rarity to find any commodity increasing so rapidly in production and showing a rise in price so constant and sustained. We feel sure that these encouraging results will tend toward even more strenuous efforts on the part of planters to excel in *quality* the produce of other tea-growing countries, while they continue to increase the *quantity* of their exports. We would strongly urge them to remember that the future prosperity of the Ceylon tea trade must depend mainly upon the excellence of quality to which the article attains."

Looking at the astonishing rapidity of production in Ceylon and the certainty of progress at a much accelerated rate, figures are produced to help to a solution of the questions, What new markets for tea can be opened ? and, What room for expansion is there in existing markets ?—questions which are of more importance to the health of the tea-drinking

people everywhere, perhaps, than to the commercial prosperity of Ceylon.

That the excessive use of tea is a common cause of ill-health, and sometimes the foundation of serious disease, will hardly be questioned by any good medical observer. With regard to the amount which may be said to constitute an excess, it is measurable only by its effects.

Tea is a stimulant, exhilarating to the nervous system, and therefore frequently useful in nervous exhaustion, if not abused. Like other stimulants, it at first accelerates the circulation, quickens the pulse, and, to the exhausted, imparts a feeling of general comfort, exhilaration, and wakefulness. But these effects, even in those who have need of it, are shortly followed by reaction. The feeling of exhaustion returns, and, if it has been taken in excess, not unfrequently with interest. The heart's action is enfeebled by persistency, though more rapid, amounting to palpitation ; and the feeling of exhaustion is increased to general depression and torpor. A sinking sensation at the pit of the stomach, flatulency, feebleness of muscular power and unsteadiness, lowness of spirits and mental despondency, are also common effects. Again and again, it may be, these symptoms in their incipiency are relieved, and in turn aggravated, by repeated or increased potions. They may greatly vary in different individuals, but they are the common effects of the excessive use of tea, or *theine*, the organic alkaloid of tea. Theine is sometimes used as a medicine, but always cautiously, for it is potent, and when carried too far, like the tea which contains it, is permanently injurious.

Besides theine, tea contains *tanin*, which is astringent in its effects, and a common cause of constipation. In many persons tea, on this account, gives rise to attacks of or continued indigestion, biliousness, and dyspepsia, necessitating the frequent resort to aperient medicines or "medicinal" food, to counteract the tendency of tea to cause constipation, but promotive of disease.

Any quantity of tea followed by the effects described is in excess and injurious to health ; and many persons there are who cannot take any at all without injurious results. They should not be mistaken for the effects of adulterants.

A. N. BELL.

SACCHARINE—THE NEW COAL-TAR SUGAR.

THIS new principle recently obtained from coal-tar is said to be 230 times sweeter than cane sugar. It was discovered by C. Fahlberg, a German chemist, but for a long time past a resident of this country. Its chemical name is benzoyl sulphonic imide. It presents the appearance of a white powder, and crystallizes from its aqueous solutions in short, thick prisms. Unlike sugar, it dissolves readily in alcohol. It melts at 200 degrees Centigrade. Its taste in largely diluted solutions is intensely sweet. One part will give a very sweet taste to 10,000 parts of water. When taken into the stomach in quantities in which it is added to produce the ordinary sweetness of sugar, it has no injurious effect whatever on the human system. It has been given to dogs in quantities equal to two and a quarter pounds of sugar a day, without producing any perceptible ill effect on the animal.

It has been given to patients suffering from diabetes without their feeling any inconvenience from its use. Physicians will no doubt be pleased to find a sweetening substance by means of which diabetic persons may enjoy food that has heretofore not been admissible in their case.

Saccharine does not belong to the class of carbohydrates, and does not possess nutritious properties. Dr. Fahlberg combines glucose with starch sugar, and thus obtains a compound which he calls "dextro-saccharine," which, as far as the taste is concerned, is scarcely distinguishable from the best sugar. The quantity of "saccharine" used is in the proportion of one part to from 1000 to 2000 parts of glucose. Now, if we look at the price of saccharine, which is at present about $12 a pound, we shall find that even at this price such a mixture would be very considerably cheaper than real sugar; but we must bear in mind the fact that there is great likelihood of the process of manufacture of saccharine being considerably cheapened; the expensive phosphorus-pentachloride may probably be replaced by a cheaper compound, etc.

The solubility of saccharine in ether might probably be

useful in detecting its presence when mixed with sugar. This discovery offers a new and important use for coal-tar, and saccharine promises to become a very important rival to sugar.

In its manufacture, Fahlberg commences with toluene, a hydrocarbon, present in coal-tar. This toluene, $C_6H_4(CH_3)$, he converts into its two monosulphonic acids, and transforms these by treating them with phosphorus-pentachloride (PCl_5) into the corresponding toluene-sulphonic chlorides. Of these two toluene-sulphonic chlorides—namely, the para and the ortho, only the ortho compound, which is liquid (the other being solid), is suitable for the production of saccharine. By the introduction of the amido group of ammonia, this ortho-toluene-sulphonic-chloride is then converted into ortho-toluene-sulphamide, which finally yields, by oxidation, the benzoyl sulphonic imide or saccharine.—*Mining and Scientific Press.*

EXTRAORDINARY MEDICAL SKILL.—One stormy night, when the roads were well-nigh impassable, a son of Erin came into a doctor's office and desired the dispenser of physic to go to see a friend who was "jist a-dyin'." He would not take no for an answer; so, putting the saddle-bags upon his horse, the physician started out upon his journey. As soon as he saw the sick man he knew it was nearly over with him, and remarked to the courier:

"Peter, you told the truth; your friend is just at the point of death."

"Can't ye do ainytheeng for heem?" replied Peter.

"No; it is too late."

"But, docthor, ain't ye goin' to give heem ainytheeng at all, at all?"

"It will do no good."

"But, docthor, ye have come so far, it would be too bad to go back without doin' ainytheeng."

For the peace of Peter's mind, the doctor now took a small quantity of sugar from a phial, and placed it upon the dying man's tongue just as he was drawing his last breath.

Peter, seeing his friend's head drop back, looked up to the doctor with big eyes, and said, half in a whisper, "Oh, docthor, an' didn' ye do it quick!"—*Harper's Magazine.*

HEALTH OF THE U. S. ARMY FOR MAY, 1886.

DURING the month of May, in eight military departments, embracing 144 military posts and arsenals and 24 commands operating in the field from which reports were received, there was a total mean strength of 23,395 officers and enlisted men.

There were admitted to sick report 2423 cases of disease and injury, or 104 per 1000 of mean strength.*

This is a decrease of 4 per 1000 below that for May, 1885, and 38 per 1000 below the average monthly rate for the ten years (ending December 31st, 1884), which was 142 per 1000 of strength.

Nineteen deaths occurred, as against 13 for the previous month, and 17 for the previous May. This represents an annual mortality from all causes of 9.7 per 1000, or 3.0 per 1000 less than the average for the preceding decade, which was 12.7 per 1000 of mean strength.

The rate of recoveries to the whole number under treatment was 7.08 per 1000; the rate of deaths, 6 per 1000.

The average duration of treatment among patients who recovered was 9 days, and among those who died, 16 days. The causes of deaths were returned as follows: Remittent-fever, 1; pneumonia, 1; pulmonary phthisis, 2; angina pectoris, 1; valvular disease of heart, 1; rheumatism of heart, 1; gastric ulcer, 1; diabetes mellitus, 1; prostatic hypertrophy, 1; heat-stroke, 1; strychnia poisoning (suicidal), 1; concussion of brain, 1; drowning (accidental), 2; shot wounds, 4, 1 of which was accidental, 1 while escaping from the guard, and 2 in action with hostile Indians.

The causes of admission, and those which have chiefly served to impair the health of the army during the month of May, are shown in Table I.

* The names and diseases of all officers and enlisted men who are excused from any part of their military duty by reason of disability are required to be entered upon the reports from which these data are drawn.

TABLE I.

Causes of admission in the order of their numerical importance.	Number of cases.	Rate per 1,000 for May, 1886.	Average rate per 1,000 for ten previous Mays.	Increase or decrease of rate.
First.				
Injuries and accidents	446	19.07	21.30	— 2.23
Contusions and Sprains	248	10.61	15.06	— 4.45
Incised, punctured, and lacerated wounds	91	3.89	3.71	+ .18
Shot wounds	13	.56	.57	— .01
Fractures (not shot)	12	.51	.65	— .14
Freezing and frost-bite	1	.04	.02	+ .02
All other injuries.	81	3.46	1.29	+ 2.17
Second.				
Diseases of the digestive system.	307	13.12	?	?
Constipation, dyspepsia, and colic	133	5.68	9.14	— 3.46
Tonsillitis, pharyngitis, and sore throat	101	4.32	?	?
Other diseases of this class	73	3.12	?	?
Third.				
Malarial-fever and resulting conditions	228	9.75	17.85	— 8.10
Fourth.				
Rheumatism	207	8.85	10.81	— 1.96
Fifth.				
Diarrhœal diseases	207	8.85	15.69	— 6.84
Diarrhœa	184	7.87	13.65	— 5.78
Dysentery	14	.60	1.56	— .96
Cholera-morbus	9	.38	.48	— .10
Sixth.				
Diseases of the respiratory system	203	8.67	14.67	— 6.00
Catarrh	110	4.70	9.25	— 4.55
Bronchitis	59	2.52	3.71	— 1.19
Pulmonary phthisis	9	.38	.37	+ .01
Pneumonia	7	.30	.31	— .01
Pleuritis.	4	.17	.47	— .30
Other diseases of this class	14	.60	.56	+ .04
Seventh.				
Diseases of the nervous system	182	7.78	10.79	— 3.01
Headache and neuralgia	160	6.84	9.79	— 2.95
Other diseases of this class	22	.94	1.00	— .06
Eighth.				
Venereal diseases	144	6.16	8.10	— 1.94
Gonorrhœa and results	74	3.16	4.11	— .95
Syphilis and results	39	1.67	3.79	— 2.12
Other diseases of this class	31	1.33	.20	+ 1.13
Ninth.				
Enteric-fever	1	.04	.11	— .07
Tenth.				
Typho-malarial fever	1	.04	.13	— .09

The number of discharges for disability was 91,* representing an annual loss to the army from this cause of 47 per 1000 of strength.

The number of troops constantly non-effective from sickness was 867, or 37 per 1000 of strength, being 1 per 1000 below the rate for last month. The rate for the previous May was 36 per 1000, and for the previous decade, 44 per 1000 of strength.

Among the more important diseases under treatment during the month of May, those remaining sick from the previous month being included, were 15 cases of pneumonia, 7 new cases being reported, 26 cases of pulmonary phthisis, 9 of which were new admissions.

A comparison of the health of the several military departments is given in Table II.

TABLE II.

	Admission rate per 1,000 of mean strength.	Number of troops per 1,000 of mean strength constantly non-effective from sickness.	Average number of days treated among patients who recovered.	Rate per 1,000 of deaths to number of cases treated.
Department of:				
Texas	147	48	7	3
Platte	112	38	7	4
East	112	36	10	6
Missouri	111	42	10	9
Dakota	93	33	9	4
Arizona	90	37	9	12
Columbia	78	33	13	0
California	44	25	11	0
The entire army for the month	104	37	9	5.8
The entire army for the preceding decade, monthly average	142	44	?	7.5

Only 2 cases of enteric-fever were treated during the month, 1 of which was a new admission. This is a decrease of 5 cases of pneumonia, the same number of cases of pulmonary

* Recruits at depots, discharged for disability which existed prior to enlistment, not included.

phthisis, and a decrease of 2 cases of enteric-fever from the whole number under treatment in April.

The ratio of mortality from pneumonia to cases treated was 6.7 per cent; from pulmonary phthisis, 7.7; and from enteric-fever, 0 per cent.

Of contagious and infectious diseases there were 8 cases of erysipelas, 6 of measles, 1 of mumps, and 1 of rötheln, all newly admitted.

Twenty-four posts have shown admission rates for the month which were greater than the normal of 142 per 1000 of mean strength, and 119 less.

In the Department of Texas, 50 per cent of the posts gave admission rates above the normal. In the Department of the East, 20 per cent; in the Department of the Platte, 17 per cent; in the Department of Arizona, 15 per cent; in the Department of the Missouri, 13 per cent, and in that of Dakota, 10 per cent.

None of the posts in the Departments of California and Columbia gave admission rates that were above the normal.

The posts showing the highest rates were: Indianapolis Arsenal, Ind., 296; St. Francis Barracks, St. Augustine, Fla., 290; Fort Myer, Va., 284; Fort McKinney, Wyo. Terr., 271; Fort Ringgold, Texas, 239; Fort Gibson, Ind. Terr., 230; Camp Poplar River, Mon. Terr., 220; Jefferson Barracks, Mo., 201.

The lowest admission rates were at Fort Mason, Cal., 0; Fort Gaston, Cal., 0; Fort Halleck, Nev., 0; Plattsburg Barracks, N. Y., 0; Watertown Arsenal, Mass., 0; and Fort Elliott, Texas, 12 per 1000 of mean strength.

Thirty-four posts have shown rates of constant non-effectiveness from sickness above the normal of 44 per 1000 of mean strength, and 107 below.

In the Department of Texas, 43 per cent of the posts furnished constant rates of non-effectiveness from sickness above the normal. In the Department of Arizona, 35 per cent; in the Department of Missouri, 27 per cent; in the Department of Dakota, 24 per cent; in the Department of the East, 20 per cent; in the Department of the Platte, 17 per cent; in that of Columbia, 12 per cent; and in the Department of California, 8 per cent.

The posts showing the highest constant rates were: San Diego Barracks, Cal., 344; Fort Lowell, Ariz. Terr., 148; Fort Huachuca, Ariz. Terr., 88; Fort Robinson, Neb., 88; and Jefferson Barracks, Mo., 81; while the lowest rates were: Fort Mason, Cal., 0; Fort Gaston, Cal., 0; Fort Halleck, Nev., 0; Fort Bennett, Dak. Terr., 5; Fort Townsend, Wyo. Terr., 6; Fort McDermit, Nev., 6; and Fort Cummings, N. M., 7 per 1000 of mean strength. At stations showing high admission rates, catarrh, diarrhœal diseases, disorders of the digestive system, and rheumatism have prevailed.

The causes producing high constant rates were: Malarial-fever, diarrhœal diseases, rheumatism, pulmonary phthisis, and injuries.

During the month of May, enteric-fever was reported from two stations only, St. Francis Barracks, Fla., and Fort Walla Walla, Wash. Terr., the former being a new admission.

Pneumonia existed at 12 stations, as against 18 for April and 27 for March. The cases newly admitted occurred as follows: At Vancouver Barracks, Wash. Terr., 2 cases, and at Fort Mojave, Ariz. Terr., San Carlos, Ariz. Terr., Fort Buford, Dak. Terr., Jefferson Barracks, Mo., and David's Island, N. Y., 1 case each. In addition to these, a soldier, while on furlough at Las Vegas, N. M., contracted the disease and died at that place in six days. This was the only death reported from this cause.

Erysipelas was reported at Fort Custer, Dak. Terr., and at Fort Selden, N. M., 2 cases each; at Augusta Arsenal, Ga., Fort D. A. Russell, Wyo. Terr., Fort Lewis, Col., and in a field command near Separ, N. M., also 1 case each, all newly admitted.

Measles at Jefferson Barracks, Mo., 3 cases; Columbus Barracks, O., 2 cases, and at St. Augustine, Fla., 1 case.

Mumps at Fort Reno, Ind. Terr., 1 case.

Rötheln at Fort Wayne, Mich., 1 case.

The post-surgeon at Columbus Barracks, O., reports that two new cases of measles followed the one reported last month, and that the outbreak of inflammation of the eyes was completely checked and confined to those cases originally reported.

Reports received from 23 commands operating in the field showed an aggregate mean strength of 1266 officers and enlisted men.

Seventy-six cases, or 60 per 1000 of mean strength, were admitted to sick report during the month, of which number four were transferred to permanent stations for treatment, and appear upon their returns.*

Of these admissions 55, or 72 per cent, were for disease, and 21, or 28 per cent, for injuries.

Fourteen commands were operating or *en route* in the Department of Arizona, their strength aggregating 988 officers and enlisted men, with 48 cases of disease and injury, or 49 per 1000. Two commands in the Department of the Platte, representing a total mean strength of 135, with 15 cases of disease and injury, or 111 per 1000. In the Department of Columbia 3 commands, aggregating 89 officers and enlisted men, with 6 admissions to sick report, or 67 per 1000. In the Department of the Missouri 4 commands, aggregating 53 officers and men, with 7 admissions to sick report, or 132 per 1000.

The prevalent disorders among troops in the field were diarrhœal diseases, malarial fevers, and rheumatism.

Attached to the army, and living at the different military stations, were 5200 women and 6216 children, the wives, children, and servants of the officers and enlisted men.

Among the women were reported 381 cases of sickness during the month, or 73 per 1000 living. One death occurred, representing an annual death-rate of 2.3 per 1000 living. The cause of death reported was cancer.

Among the children 320, or 51 per 1000, were taken sick.

Eleven deaths occurred (10 of which were under five years of age), representing an annual death-rate, at all ages, of 21.2 per 1000 living.

The causes of deaths were reported as follows: Hydrocephalus, 2; meningitis, 1; measles, 1; scarlet-fever, 1; diarrhœa, 1; gastric catarrh, 1; gastro-enteritis, 1; consumption, 1; convulsions, 1; inanition, 1.

Whooping-cough was reported among the children at Fort Monroe, Va., 8 cases; Fort McIntosh, Texas, 5; Omaha, Neb. (Headquarters Department of the Platte), 3; Fort Gas-

* To avoid duplication, these cases are dropped in the final consolidation for the entire army.

ton, Cal., 2; Fort Riley, Kan., 2; also at Fort Keogh, Mon. Terr., and Fort Winfield Scott, Cal.

Scarlet-fever at Fort Marcy, N. M., 2 cases, and at Presidio of San Francisco, Cal., 1; also reported at Watertown Arsenal, Mass.

Diphtheria at Fort Selden, N. M., remaining from previous month.

Rötheln at Fort Wayne, Mich., 1 case.

The prevalent diseases among this class were diarrhœal, malarial, and catarrhal affections.

The post-surgeon at Fort Marcy, N. M., reports that scarlet-fever still prevails in the town of Santa Fé, sporadic cases occurring here and there, without the possibility of tracing direct contagion. Two cases occurred in families of enlisted men outside of post, with one death. That the officers' quarters where the two cases convalesced in the early part of the month have been thoroughly cleaned and disinfected; that all cases of whooping-cough are not convalescent.

The post-surgeon at Presidio of San Francisco, Cal., states that the case of scarlet-fever reported was not contracted at that post.

The following information is furnished by the post-surgeon at Fort Selden, N. M., in reference to contagious and infectious diseases at that post:

"No new cases of diphtheria have occurred. There have been two cases of erysipelas of rather mild character.

"In two houses in the officers' row in which diphtheria occurred, a thorough disinfection was made with a solution of mercury bi-chloride 1-4000. The walls of rooms were lime-washed, with the solution added.

"The clothing was brushed and disinfected with the same before washing, and blankets soaked before washing in the same way. The mattresses and pillows were burned. It is expected that during the coming month one of the sets of officers' quarters, the last and only one not disinfected, will be made a special work of thorough disinfection."

It is reported from Fort Bliss, Texas, through the post-surgeon, that two cases of small-pox have just broken out in the town of El Paso, Texas.

BENJAMIN F. POPE,
Surgeon U. S. Army.

SANITATION IN STREET-PAVING. *

By GEORGE BAIRD, M.D., Wheeling, W. Va.

SHOULD sanitarians be consulted by municipal authorities in reference to the material used for street-paving and the manner of laying it, to best protect the lives and health of the citizens? To this question there should be only an affirmative answer. The macadam road, the cobble pavement, the wood pavement in its various forms, and the granite pavement have all been found more or less objectionable from a sanitary standpoint. The macadam, with its rapidly worn surface and its clouds of dust, carrying disease germs in them; the cobble pavement, with its noise and innumerable pockets, furnishing lodging-places for decaying animal and vegetable matter; the wooden pavement, decaying in a few years and absorbing urine of horses and foul liquids of all kinds, which were poured on its surface, and the granite, with its noise far exceeding the cobble, its slippery surface when worn, and its open crevices between the blocks, permitting liquids of all kinds to pass down and pollute the street surface beneath, are each and all of them subject to adverse criticism.

If these statements are true, the question naturally suggests itself: Is there any material known suitable for street-paving free from such objections and at the same time of such cost as to be within the reach of the great majority of cities and towns desiring to have paved streets?

It is claimed by our people that there is a material which fulfils these requirements, and that Wheeling is the city to first introduce it.

The material is the vitrified paving block manufactured by John Porter, of New Cumberland, W. Va. This block is an oblong truncated wedge 9 inches long, $4\frac{3}{4}$ inches wide, $3\frac{1}{16}$ inches on one edge and $2\frac{13}{16}$ inches on the other. It is com-

* Read before the American Public Health Association, Toronto, Can. October 7th, 1886.

posed of fire-clay, iron ore, and silica, fused to a homogeneous mass. When the surface of the street is properly graded and rolled the blocks are laid in three or more inches of sand, the broad and narrow edges turned upward in alternate rows, and the joints broken, as in first-class brickwork. The spaces between the blocks are brushed full of finely screened gravel and paving cement poured on this until they are made completely water-tight. Over the surface of the pavement pitch is poured, and a layer of sand one half inch thick is spread. The roller is then passed back and forth over the pavement until all the blocks are firmly settled in their places, and the entire surface forms a continuous uniform plane.

The advantages of this pavement are the antiseptic properties of the pitch on its surface and between the blocks, the providing a water-tight cover for the surface of the street, preventing the passage of foul liquids to the street beneath, and also furnishing the great desideratum for a good street—to wit, a dry foundation, the absence of depressions in which animal and vegetable matters can lodge and decompose, the ease and economy in cleansing it, its not absorbing urine of horses or any foul liquids, its freedom from noise, and its not being affected by frost or heat.

It also offers less resistance to the passage of heavily loaded vehicles than any other street surface except asphalt, and it has an advantage over it in its not being slippery in any weather or on any grade. The combination of pitch and sand affords a sure footing for horses at all times.

The life of the pavement is without limit. A renewal of the surface coating of pitch and sand when worn of at a cost of one cent per square yard will prevent all wear of the block.

The cost of this pavement is not more than cobble, much less than wood, less than one half that of asphalt, and not one third that of granite.

A pavement called the Steubenville pavement has been extensively noticed in the newspapers in the United States, and has been a good deal sought after on account of its supposed cheapness. It is made of fire bricks of the size of an ordinary red brick, laid on their edges, in sand, and rammed or rolled. The same objections exist to this pavement as to the cobble and granite pavements. The crevices between the bricks are

filled with sand (no pitch and gravel being used), through which foul liquids are liable to pass down. Wherever this occurs, the bricks not having any power of resistance to the downward pressure of loaded vehicles passing over them, on account of their sides being straight and not beveled, as the blocks are, depressions are made in which decomposing substances lodge. These depressions also add to the noise which the unprotected street surface gives rise to. The surface being bare of pitch and sand allows the wear and tear of the brick to be much greater than if it were covered, and reduces the life of the pavement to a few years at most; for these reasons this apparently cheap pavement will prove not only a dear one, but also an unhealthy one—dear because it will in a few years cost as much as it did at first for repairs and relaying, and unhealthful, because there is not a single sanitary precaution taken in its construction.

A brief statement of Wheeling's experience in brick and block pavements may show why her people have such firm faith in their good qualities.

A few years ago it came to the knowledge of our Board of Public Works that street pavements composed of hard burned *red* bricks, laid on a board foundation, had been in use in towns in France and in one or two places in this country for many years. Thoroughly disgusted with cobble and macadam, having no faith in wood, too poor to attempt having asphalt or granite, and satisfied that here was a style of pavement which, if successful, would prove a blessing to our people, the Board laid a few squares of a pavement of *fire-brick* on a board foundation. Each board was soaked in boiling pitch before being laid and the bricks laid in a bed of sand, spread on the boards. The crevices between the bricks and also the surface of the pavement were not poured with pitch until a year or more after the pavement was laid and after experience in the *block* pavement showed the advantages of doing so. Satisfied that in a few years this board foundation would decay and become detrimental to health, the Board used the vitrified block before mentioned. Two objects were especially desired to be accomplished by it. One was to do away with the board foundation, and the other was to have the blocks of such shape as to be self-sustaining and furnish crev-

ices which would securely retain the gravel and pitch and make them thoroughly water-tight.

Several of our principal streets have been paved with the blocks, and although those are the streets over which the greater part of the travel and heavy hauling of a manufacturing city of thirty-five thousand people have passed for several years, there has not yet been a dollar expended for repairs on them.

During the past season there have been ten streets paved with the fire-brick without the board foundation, but with the crevices brushed full of sand and hot pitch poured in them as well as on the street surface. This makes a much better and more healthful pavement than the Steubenville pavement, but at a somewhat greater cost. This will be offset by the longer life of the pavement and its less liability to require repairs.

It is open, however, to the objection that the bricks are not self-sustaining, but will become depressed and furnish lodging-places for offensive substances.

The first cost of this brick pavement being a few cents less per square yard than the block pavement, has made it many advocates here, and it will require time to convince its friends that the block pavement will in a term of years be, by odds, the cheaper one. Be this as it may, one thing can be safely claimed for this style of pavement, and that is, there are more recommendations in its favor from a sanitary standpoint than there are for any other street pavement at present in use.

RECENT PROGRESS IN THE INVESTIGATION OF HOG CHOLERA.*

By D. E. Salmon, D.V.M.

The interest which this Association was pleased to show in the remarks that I had the honor to make on the cause of hog cholera at the meeting of one year ago encourages me to give a brief account of some more recent investigations of the same disease.

The experiments of the year, which have been very numer-

* Read before the American Public Health Association, Toronto, Can., October 7th, 1886.

ous, abundantly confirm the conclusion that this disease is caused by a bacterium—that is, an organism which exists in the form of a short rod and is generally united in twos, and sometimes in fours. It is motile, stains deeply around its entire periphery, and, so far as we have been able to ascertain, does not form spores. It grows on nutrient gelatine without liquefying it. The cultures of it are fatal to mice, rabbits, guinea pigs, pigeons, and swine, but they do not seriously affect fowls.

A very interesting point is that pigeons may be protected from the fatal effects which ordinarily follow inoculation with these cultures by first injecting into their tissues two doses of 1 cc. each of culture liquid in which the microbe has been allowed to multiply and has afterward been destroyed by heat—in other words, the products of the bacterial growth confer an immunity from the effects of the living germs. We have used forty-four pigeons in these experiments, and while a few of the experiments have given negative results, the majority of them have been perfectly satisfactory. A brief reference to a few of these experiments will give a clearer idea of their convincing character. The heated virus was in all cases tested for living germs before using as a preventive by placing two or three drops of it in a tube of fresh culture liquid and allowing it to stand in the incubator a sufficient time to show if any multiplication was possible.

In the first experiment four pigeons received the two doses of sterilized culture necessary to protect them, one received but one dose, and one pigeon kept for a check did not have any protective treatment. The six were inoculated with the same dose of a culture containing living germs. The effect of this occulation was to kill the unprotected pigeon in twenty-four hours. The bird which had received one dose of protective liquid lived forty-eight hours. The remaining four, which had been treated with two doses, were not at all affected.

In the second experiment there were six protected birds and three checks. All of these being inoculated with strong virus, the six protected ones remained well, two of the checks died, and one was not affected.

In two other experiments there were six protected birds and

two not protected. When inoculated with the living germs the two unprotected ones died and all the protected ones remained well.

We have not yet been able to apply this method of granting immunity to other animals, owing to the many difficulties encountered in the investigations; but the principle is a very interesting one, and will doubtless be developed in the future.

While this disease, as it occurs in the herds of the country, is extremely virulent and fatal, a considerable dose of the virus may be injected hypodermically without producing serious effects in swine. We have inoculated in this way with $\frac{1}{4}$ cc. and have lost no animals from this dose. By increasing the quantity to $\frac{1}{2}$ cc. the operation becomes more dangerous, but even in this case only one animal out of eight succumbed. Such inoculations evidently confer a certain degree of immunity, because the individuals which have been operated upon in this way may afterward be inoculated with 2, $2\frac{1}{2}$, or even 3 cc. without any serious results.

The test of inoculation, however, is certainly far from being as severe a test of immunity as actual exposure to the contagion in infected pens. Thus pigs which had received $\frac{1}{4}$ to $\frac{1}{2}$ cc. of virus for a first dose were not sufficiently protected to enable them to resist exposure to sick pigs in infected places.

If so large a dose of virus may be injected into the tissues without producing fatal effects, it seems difficult, at first, to explain how the contagion, carried on the feet of animals and people and in many other ways in which but a small quantity can be transported, is able to infect individuals and start new outbreaks. Yet this is evidently true, or the plague could not spread from herd to herd as frequently as we know it does. It would seem that the small quantity of contagion which is carried and deposited upon the new premises must find there a nidus suitable for its multiplication before herds can be infected in that way.

To test this hypothesis, we have placed the organisms in hay infusion, and find that it is able to multiply in such a liquid. But what is more remarkable is its life and rapid development in ordinary water. An idea of this can be obtained from the following experiment: 10 cc. of Potomac water, such as is supplied to the families of Washington, was sterilized by

heat and as many germs of this disease added as would be carried on a small loop of platinum wire dipped into a culture liquid. It was then tested to determine the number of microbes that had been added to each cc., and there were found to be 26,240. This was September 8th. On September 9th there were 201,600 germs to the cc., showing that they had increased nearly eightfold in twenty-four hours. September 10th there were 1,296,000 germs to the cc., an increase of fifty-fold in forty-eight hours. September 13th there were 2,608,200, an increase of one hundredfold in five days. The limit of growth to each cc. of water is reached by the last figures given, and after this period the number of living germs begins to decrease. We have here, consequently, the demonstration that this pathogenic organism may multiply to a wonderful extent in water as pure as that of the ordinary running streams of the country. It is true that in this case the disease germ did not contend with the ordinary germs with which all waters in nature are more or less contaminated, and it is possible that their development would be somewhat affected by the presence of these other species. It may be admitted, however, that these germs have the power of living and multiplying in water or in moist organic matters such as usually exist in enclosures where hogs are kept.

Drying is destructive to this germ, though it retains its vitality for a considerable time. With drops of culture liquid dried on cover glasses we found that in some cases the germs would all be destroyed after eight or nine days, but in other cases there were still living germs after twenty-two days. In small pieces of spleen not larger than a pin-head which were thoroughly dried there were still living germs at the end of forty-nine days.

The tests of disinfectants have given some unexpected results, and emphasize the necessity of determining the effects of these agents upon each specific microbe. This organism is destroyed by a solution of permanganate of potash of 1:5000 acting for fifteen minutes. Of sulphuric acid, 1:2000 is required ; of carbolic acid, 1:80 ; of mercuric chloride, 1:75,000, and in some preliminary experiments with mercuric iodide this agent was found efficient in the strength of 1:1,000,000.

As stated in my paper of last year, the germ which we have

found in hog cholera is very different from the bacillus of *rouget* and *rothlauf*. Within the year Schütz has described the microbe of the disease called by the Germans *schweineseuche*, or swine plague. This organism is also different from ours, though it belongs to the same genus, each being a short rod or bacterium. The comparison of these different species is very interesting. The bacillus of *rouget* and *rothlauf* is in its microscopical characters very closely related or identical with the bacillus of the septicæmia of mice, while the bacterium of *schweineseuche* approaches very closely or is identical in such characters with the bacterium of rabbit septicæmia. The bacterium of fowl cholera has also been considered to be identical in microscopical appearances with the microbe of rabbit septicæmia.

The bacterium of hog cholera differs from that of rabbit septicæmia in having great motility in liquid cultures, while the latter is without any power of movement. It also stains differently. Properly prepared specimens show a light centre and a uniform band of darker color around the entire periphery. The bacterium of the septicæmia of rabbits when stained has a light median portion, with deep stains at the ends. These peculiarities brought out by staining enables us to distinguish very easily under the microscope between the two germs.

THE SUFFICIENCY OF STEAM HEAT AS A DISINFECTANT.

BOARD OF HEALTH, STATE OF LOUISIANA,
NEW ORLEANS, October 15, 1886.

A. N. Bell, M.D., Editor The Sanitarian, New York.

DEAR DOCTOR: I send you enclosed the copy of a letter which explains itself.

After my conversation with yourself and the gentlemen named in the letter, I became fully convinced of the utter uselessness of retaining a complicated piece of work as a part of the steam-disinfecting apparatus. Your views, then and heretofore expressed, of the entire sufficiency of the moist heat of high temperature, as in itself a potential agent of the most

decisive kind, squares so entirely with my conviction, based upon its practical operation, that I am willing to rely upon that single agent in our treatment of clothing, baggage, ship's linen, etc.

If you consider the subject of this letter of sufficient interest, I would be obliged to you if you were to give it place in your journal. I know that it appertains to a general question to which you have devoted much earnest study.

I hope that you reached home safely and well from your Toronto journey. The meeting at that place, while not numerously attended, was thoroughly representative, and was characterized, so far as I was able to judge, by a strict attention to business and the execution of a great deal of work.

I returned home direct, and am back again, very busy in my office.

Drs. Sternberg and Rohé requested me to make a written report of my statements before the Committee on Disinfectants of the American Public Health Association concerning our method of the treatment of clothing, etc., by steam, to be presented by them as an addendum to their report, intended for publication in the transactions of the Association.

I will soon prepare that report, and as it relates to a most important branch of general quarantine service, would be happy to offer it to you for publication in THE SANITARIAN; inasmuch as we are all aiming at practical results, I can see no possible objection to its widespread and certain promulgation in this way.

Yours, very truly,

JOSEPH HOLT, M.D.

BOARD OF HEALTH, STATE OF LOUISIANA,
NEW ORLEANS, October 15, 1886.

Thomas Y. Aby, M.D., Resident Physician, Mississippi Quarantine Station.

DEAR SIR: As one of the first of my official acts upon reaching home from Toronto, I hereby request the discontinuance of the use of the bi-chloride of mercury in the treatment of clothing, baggage, and ship's linen in the steam superheating chamber.

After a thorough discussion of the question with several of the leading sanitarians of the country, including Drs. Sternberg and Rohé, of the Committee on Disinfectants of the American Public Health Association, and Dr. A. N. Bell, editor of THE SANITARIAN of New York, to whom I explained our method of treatment, assisted by the model of the disinfecting chamber constructed by Mr. De Armas for that purpose, there was a general consent to the opinion already reached by you and myself, that the bi-chloride of mercury atomizing apparatus was unnecessary and therefore a useless complication for two sufficient reasons :

1. That the high degree of moist heat attained was in itself as reliable and complete an agent of disinfection as could be desired.

2. The lack of proof that the steam charged by atomizing with the bi-chloride of mercury solution applies the metallic agent equally throughout all parts of the chamber, and in a strength such as to guarantee protection from this alone.

This special apparatus was devised at a time when we were of the opinion that it would be extremely difficult, if not impossible, in practice to obtain any approximation to the high degree of temperature which we, by the methods used, have since invariably reached, and which will be greatly increased in our work next season ; in view of this fact it is a useless expenditure of time and material to continue further any part of the process other than the steam of not less than 226° Fahrenheit.

By a slight modification of our minimum temperature next season it can be fixed at 235° Fahrenheit, which will certainly preclude the necessity of an additional agent.

This final simplicity in one of the most important departments of quarantine work marks a decided advance in the perfection of the system.

A copy of this letter will be sent to the members of the aforenamed committee, the editor of THE SANITARIAN, and to the several quarantine stations of the country.

Yours, very truly,

(Signed) JOSEPH HOLT, M.D.,

President Board of Health, State of Louisiana.

EDITOR'S TABLE.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

THE fourteenth annual meeting of the American Public Health Association convened in Shaftesbury Hall, Toronto, at ten o'clock on Tuesday, October 5th, 1886, and continued four days. Under the direction of Drs. Bryce, Covernton, and others of the Local Committee, the arrangements were very complete; and the meeting, all things considered, was one of the most successful the Association has ever held. The civil authorities, citizens, and the ladies, in particular, greatly contributed to both interest and enjoyment, insomuch that the Toronto meeting may be justly regarded as an important mile-stone in the progressive work of the Association.

The sessions were confined to morning and evening, leaving the interval for committee work.

The first session was promptly called to order by the President, Dr. HENRY P. WALCOTT, of Cambridge, Mass., and after the exercises and announcements usual on such occasions, and the reports of the Secretary, Treasurer, and Executive Committee, the first paper on the programme, the

Destruction of Night Soil and Garbage by Fire, by GEORGE BAIRD, M.D., of Wheeling, W. Va., was called for, and read by Dr. JAMES E. REEVES, in substance as follows:

"The relative situations of Wheeling, W. Va., and Bellair, O., is such that the drinking-water of the latter place is polluted by the night soil of the former, showing the folly of the claim that a running stream of water will purify itself in a few score feet. Opposite the extreme southern limit of Wheeling, on the west side of the river, is the north limit of Bellair. The latter town takes its water supply from the river into which the former place pours its night soil. The consequence is that Bellair is made a hot-bed of disease. For the purpose of doing away with the evils caused in this way, the Wheeling Health Department last spring made a series of experiments in the destruction of night soil and garbage by fire, and they

claimed that, as a result, they had found a means of entirely destroying these substances and their power to do evil. Two facts about the burning of night soil impressed them. One was that the odor was not such a one as all thought it would be. It was something akin to the smell of burnt leather. Another was the intense heat required to burn it. The first experiments were made in a bench of five retorts at the city gas works. The night soil was mixed with fifty per cent of fine slack, and three retorts charged with this mixture. The other two retorts were charged with a mixture of equal parts of night soil and 'breeze' (fine coke siftings). The retorts were charged at 11 P.M., and it was not until seven o'clock next morning that the contents were reduced to a fine odorless powder. Another experiment of the same kind showed that retorts were not the proper things for successful combustion, owing to the want of a full supply of oxygen. It was then determined to find a furnace with a strong draft, capable of producing a greater heat than could be obtained in the retorts. The boiling furnace of a nail mill was then prepared *for a third experiment.*

"After twenty-four hours' heating a charge of twenty per cent fine slack and eighty per cent night soil was made, and it was burned in one hour and twenty minutes. A second charge of 'breeze' and night soil was made, and it was burned in a little more than one hour. A third charge of night soil alone was made, and it was burned in about the same time as the first charge. Application was then made for the use of a Smith gas-furnace for the heating of steel slabs preparatory to being rolled into nail-plate. This furnace is much larger than the boiling furnace, and capable of generating a more intense heat than any furnace known. The use of one of these furnaces was given. The result was as follows: A barrel of ordinary garbage or slop was burned in four minutes; a barrel of butchers' offal (bones and animal matter) was burned in seven minutes; a barrel of fluid night soil, thrown into the furnace with buckets, was almost instantly evaporated, and a barrel of solid fæces was burned in fifteen minutes. Convinced that this furnace had every requisite for fulfilling the design of destroying night soil and garbage, the Committee reported the result of the above experiments to

the Council, and recommended the making of a contract for the building of such a furnace, capable of destroying daily sixty tons of night soil and garbage, and also for burning dead animals of all kinds which might die within the city limits, as well as the refuse matter from the butcher-shops. This furnace is to be constructed for using natural gas as a fuel. Of its success the writer maintains that there could be no doubt. The heating capacity of natural gas is more than four times greater than that of coal, which was used in destroying night soil in a boiling furnace in one and one quarter hours. With artificial gas generated from fine slack the night soil was burned in fifteen minutes. With natural gas better work could be done.

"Notwithstanding the great difficulty in destroying this substance by fire, there is in the use of natural gas, as a fuel, more risk of destroying the furnace than of not entirely consuming the night soil. It must not be understood, the writer continued, that this furnace can only be used in cities and towns where natural gas has been introduced as a fuel. Mr. Smith has gas generators built with his furnaces in cities where there is no natural gas, and claims that he can produce a heat of greater intensity and with more economy than by any other method or from any other source outside of natural gas, and as cheap as natural gas can be supplied by a private company. The fine coal or slack is not the only substance from which artificial gas can be generated. Tanbark, peat, and many other substances can be used. Mr. Smith's faith in the success of the furnace is so strong that he has agreed with the Wheeling corporation to ask no compensation until, by a series of successful experiments, he has shown its capacity to destroy all substances proper to be offered as tests of its powers."

In reply to a question, Dr. REEVES stated that the cost of the furnace does not exceed $2500.

Our Inland Lakes and Rivers, the Disposal of Sewage and the Spread of Infectious Diseases, was the subject of a paper by Dr. EDWARD PLAYTER, of Ottawa, who read as follows: "A large part of the disease to which humanity is subject is caused by the cast-off matters of the body finding their way back into the body, the air, and water. Under such circumstances it

was inconceivable with what criminal negligence the inhabitants of towns and cities treated the matter of the preservation of the purity of the water-supply. On the average every square mile of Lake Ontario, for instance, received the excreta and washing water of sixty-five persons. The water of the lake was changed only about once a week, and it came from Lake Erie, which was polluted still more than Lake Ontario. The tendency was, therefore, for sewage matter to increase. It had to be remembered, too, that much of the excreted matter came from patients suffering from contagious diseases. There was some diversity of opinion as to the oxidation of this matter. The danger of pouring sewage into our lakes was that the specific germs of contagious diseases might remain in the water when a chemical analysis would give no trace of their presence. These germs taken into the stomach would develop the specific disease under favorable conditions. The only safety seems to be to stop putting our sewage into our rivers and lakes, or else to take our water from great depths in the soil by artesian wells." He suggested the appointment of a committee to discuss the best steps to be taken to induce the masses of the people to change their system of sewage disposal.

Toronto Sewers, by ALAN MACDOUGALL, was the next paper read. It gave a history of the Toronto sewers abridged from Mr. Sproatt's statement made to the City Council. The writer commented at length on the necessity of putting the outfall of the sewers as far away east as possible from the intake crib of the water-supply. In treating of the sewers, he said those on Simcoe and Sherbourne streets were the most troublesome, the sewer gas constantly entering the houses when the wind was in a certain direction.

Dr. WILLIAM OLDRIGHT, of Toronto, discussed the subject with special reference to the influence of sewerage on the health of Toronto. He pointed out that at Frankfort-on-the-Main the death rate from typhoid-fever has been reduced by improved sewerage from 87 per 100,000 of the population to 27. In other cities similar results had followed from improved drainage and sewerage. He claimed that in Toronto, by proper attention to these matters, the death rate from typhoid-fever could be reduced from 65 to 24 per 100,000, or

even to 18 and 17. The want of sewerage was specially apparent in parts of St. John's ward, where 18 tons of matter was added to the soil in pits for an area of 67 yards by 200 yards. The wells had been so polluted that they had been entirely condemned, and they were ceasing to be used. Another evil they were endeavoring to remedy was the deposition of garbage in hollow places by the substitution of cremation. Another pressing want was an adequate inspection of plumbing. He related cases in his own practice where whole families had been attacked by diphtheria caused by defective plumbing. In regard to the ventilation of sewers, he advocated the overhead system by means of pipes running through the houses above and clear of everything. He did not believe in traps at the upper end of sewers. He characterized the pollution of the bay as a disgrace to the city. If cholera should be introduced into the city, the dangers of its becoming epidemic from the pollution of the bay would be very great. He explained the features of the proposed trunk sewer, and said he did not believe in the locality of the proposed outfall. He trusted that if the by-law passed, the city would not be committed to it. The question was whether the sewage would not find its way into the intake crib of the water-supply and typhoid germs be introduced into our drinking water.

Mayor HOWLAND explained the reasons why the engineers had taken a certain course in reference to this matter. He was very anxious, because the next day the system had to be voted upon. He had got before the people a scheme for a grand trunk sewer, and now his friends of the Board of Health had expressed opinions which might cause a loss of 500 to 1000 votes. The present position was that the sewage of 120,000 people was pouring into the bay. It fermented all the summer; caused diphtheria and increased the death rate on diseases of this character.

The conduit pipe across the bay was not perfect, and they were taking in a mixture of lake and bay water. They therefore wanted to stop pouring sewage into the bay. They had got Mr. McAlpine, of New York, said to be the cleverest engineer in the United States, and Mr. Tully, who had made the subject a study for years, and had associated with them their own engineer to frame a scheme. They reported a

scheme based on the needs of a population of 300,000. In the proposed scheme one of the main sewers had a fall of fifteen feet, which was never lost, while the other had a rate of five miles flow per hour. The engineers said those conditions would give enough force to drive everything before it. Mr. McAlpine had studied the intake, and had considered that its bend was eastward, and anything on the slope must go down east. The temperature of the water at the outfall was 46°, so that decomposition of the heavy sewage matter would not take place and it would sink below the surface, while the lighter portion would float and be disseminated. The danger of contaminating the intake crib was remote, for even although the sewage of the Humber and Parkdale entered a current which flowed past it, no trace of sewage had been discovered at this crib. The plan, if indorsed by the people, would take five years to carry out. A flaw in the details as to the outfall might be corrected as the works progressed. Messrs. McAlpine and Tully were as firm as a rock that the position of the outfall was far enough east. Mr. Sproatt was timid and wanted it out further, and on that account they had carried it a mile further, or five miles from the intake crib. If the by-law were defeated, it might take ten years to get another scheme before the public, and the state of things would be terrible. The deaths last July were at the annual rate of 31 per 1000. With the healthy location Toronto enjoyed, her death rate should not exceed 15 or 18 per 1000. He hoped the Association would assist him by a declaration of their opinion, which would have its influence with the citizens.

Dr. JOHNSON, of Chicago, said the people of Toronto were about to decide on a question which had an important bearing on their death rate. They found that three hundred persons were dying every year from unsanitary conditions, who should not die if the sewerage system was perfect. These deaths represented a vast annual pecuniary loss to the community, and the people, if they judged the matter from the standpoint of political economy only, would do wisely in voting for the by-law.

The subject was further discussed, and the importance of sewerage for Toronto urged by Drs. RAUCH, E. C. JORDAN DEVRON, E. M. HUNT, CASSIDY (Medical Health Officer of

Toronto), COVERNTON, and others, after which resolutions were offered and referred to the Executive Committee for formulation and report.

THE EVENING SESSION was held in the theatre of the Normal School, which was filled, and in goodly proportion by ladies.

Professor DANIEL WILSON, who occupied the chair, opened the proceedings by expressing, on behalf of the citizens, the extreme pleasure with which they welcomed the meeting of the American Public Health Association. He called upon Provost Body to offer up prayer.

Provost BODY having led in prayer,

Dr. COVERNTON gave a short address, in which, on behalf of the Provincial Board of Health, he expressed their sense of the honor conferred upon them by the holding in Toronto the fourteenth annual meeting of the Association. He extended to their American visitors a hearty welcome. He made a graceful reference to the philanthropic object of the Association, which was to prevent disease. In commenting upon the work which had been accomplished by the Association, he said the progress of applied hygiene was not so rapid as sanitarians desired. They had been successful, however, in getting improved sanitary legislation. In Ontario the Government had shown its willingness to strengthen the hands of the Provincial Board of Health by supporting and passing needed legislation. The public here were indebted to the Government for the prevention of the spread of the small-pox in Montreal to this province.

The CHAIRMAN said the Minister of Health had been prevented from being present by indisposition. He called upon Hon. A. S. Hardy to act in his stead.

Hon. A. S. HARDY made a very felicitous speech, in which, on behalf of the Government, he extended a cordial welcome to the Association.

The MAYOR also made a happy address of welcome on behalf of the city.

PRESIDENT'S ANNUAL ADDRESS.

Dr. WALCOTT, the PRESIDENT of the Association, then delivered his annual address. He remarked that this fourteenth annual meeting will fill an important chapter in the history of

the Association, which is for the first time assembled in a city beyond the limits of the United States. The original inhabitants of this country seem to have made this city ready for us; they named the spot Toronto, or "a place of meeting." Let us accept the omen. In the pages of a history, which the genius of the author has made as familiar here as it is in the land of his birth, you may read that in the year 1751 Riquet, the so-called "Apostle of the Iroquois," coasting the northern shore of Lake Ontario, reached the new fort of Toronto, and made this record in his experience: "The wine is here of the best; there is nothing wanting in this fort; everything is abundant, fine, and good." One hundred and thirty-five years do not seem to have changed these cheerful characteristics of the spot. The speaker then considered the claims they might make for preventive medicine, and what expectations they were justified in forming for the future. There was enough to do, he said, in the directions where both science and experience have arrived at some definite conclusions, but advance in any quarter must necessarily be slow, made under the guidance of systematic experiments and observations controlled by scientific methods, and not in the pursuit of the speculations of theorizers. The principal object of scientific inquiry in preventive medicine during the past year has been, he said, as in the preceding year, the study of the infectious diseases and the micro-organisms associated with them. He went on to review what has been done and what is being done in the study of such diseases as cholera, small-pox, yellow-fever, scarlet-fever, rabies, and trichiniasis. All these were of too much importance to be neglected by the guardians of the public health. To meet the present needs of sanitary science, the president advocated the undertaking by the general Government of scientific investigations of diseases which are so general in their distribution that the whole country is affected by them, or of such character that the satisfactory inquiry into them would involve expenditures too great for the meagre appropriations of State and local boards of health. Some of the investigations carried on under the direction of the National Board of Health of the United States were of the highest scientific merit, and had an acknowledged authority everywhere. The public burden from the victims of the misuse of

alcohol was becoming each day greater and more intolerable. Public measures of repression had thus far been of so little avail that it seemed to him fitting, on an occasion like this and with such an audience, to invoke for this most important subject the influence and teachings of the profession so largely represented here, and of all those whose business it was to help their fellow-men to healthy minds in healthy bodies. The President enumerated the matters affecting the public health in which a general government can exercise a beneficial control. He noted the advance which has been made in State medicine in Canada since the formation of the Ontario Board of Health in 1882. In regard to quarantine, he said: "The recently published quarantine regulations of the Dominion are quite sufficient for your protection, and for ours, if they are rigidly enforced. The vast sanitary importance of this highway to the west—the road by which cholera has, once at least, entered the country—cannot be overstated." He had noticed that there was one thing allowed here in Canada which experience, in his own State at least, had condemned, the presence of municipal councillors on local Boards of Health. He concluded by calling attention to the great work which could be done by intelligent and fearless health authorities.

SECOND DAY.

Toronto Sewerage.—The Executive Committee submitted the following as the deliverance of the Association in regard to Toronto's sewage system:

"*Resolved*, That it is the sense of this Association that the construction of an intercepting or main trunk sewer, with an outlet or point of discharge sufficiently distant from the source of water supply to prevent its pollution, is an urgent sanitary necessity for Toronto." The resolution was unanimously adopted.

Greetings from Montreal.—A telegram from Dr. H. P. Gray, Chairman of the Montreal Board of Health, was read conveying the best wishes of the Montreal Board for the success of the meeting of the American Association, and expressing anticipations of very much good to the cause of sanitary reform from the meeting; also calling attention to the fact that Montreal cremates all of its household refuse and night soil.

The President was authorized to suitably acknowledge the communication.

The Use of Alcohol.—Dr. M. C. VAN BIBBER proposed the following resolution: "Since it has been proved that the hydrated oxide of methyl, or alcohol, is not a food, nor necessary to the support of human life, but, on the contrary, that its habitual use tends to excess, and that its effects are cumulative and injurious to the intellectual, moral, and physical advancement of man, therefore it is proper that the Association should declare this as its opinion; and further, be it resolved, that we are in hearty sympathy with those who desire to have its excessive manufacture, in its variously mixed compounds, curtailed, and the means of dispensing it broadcast among men regulated by the laws of different nations."

The resolution was referred, according to rule, to the Executive Committee without debate.

Sanitary License and the Medical Profession was the subject of a long paper by Dr. NATHAN ALLEN, of Lowell, Mass., which we hope to make room for entire, or at least a liberal abstract, hereafter.

Inter-State Notification of Infectious Diseases.—Dr. C. N. HEWITT presented the report of the Committee on State Boards of Health, including the subject of "inter-State notification on the outbreak of small-pox, cholera, and yellow-fever." The committee stated that the resolution adopted by the Association had been submitted to the National Conference of State Boards of Health, and after discussion lost. The committee reported that the following resolutions, forming a part of the report, had been adopted:

1. *Whereas,* It is necessary for the protection and preservation of the public health that prompt information should be given of the existence of cholera, yellow-fever, and small-pox, be it resolved that it is the sense of the National Conference of State Boards of Health that it is the duty of each State, Provincial and Local Board of Health in any locality in which said diseases may at any time occur, to immediately furnish information of the existence of such diseases to Boards of Health of neighboring and provincial States and to the Local Board in such States as have no State boards.

2. *Resolved*, That upon rumor or report of the existence of pestilential disease and positive, definite information thereon not being obtainable from the proper health authorities, this conference recommend that the health officials of one State shall be privileged and justified to go into another State for the purpose of investigating and establishing the truth or falsity of such reports.

3. *Resolved*, That whenever practicable, the investigations made under the preceding section shall be done with the co-operation of the State or local health authorities.

4. Any case which presents symptoms seriously suspicious of one of the aforenamed diseases shall be treated as suspicious and reported as provided for in cases announced as actual.

5. Any case respecting which reputable and experienced physicians disagree as to whether the disease is or is not pestilential shall be reported as suspicious.

6. Any case respecting which efforts are made to conceal its existence, full history and true nature, shall be deemed suspicious and so acted upon.

7. *Resolved*, That in accordance with the provisions of the foregoing resolutions the Boards of Health of the United States and Canada represented at this conference do pledge themselves to an interchange of information as herein provided.

Dr. BRYCE explained that he had suggested the resolutions, which had been perfected by the committee. He remarked that quarantine regulations at the St. Lawrence ports had been perfectly carried out by Canada, and similar regulations were wanted for the North Atlantic ports. It was said that ships were permitted to come into New York and Boston without the necessary quarantine regulations being carried out in regard to cabin passengers. If New York and Boston did not carry out such regulations in regard to cabin passengers Canada would not do so, because the St. Lawrence route would become unpopular.

Dr. HOLT, New Orleans, President of the Louisiana State Board of Health, pointed out the difficulties in the way of securing the inter-State notification of contagious diseases. Railway corporations, steamship lines and merchants were opposed to it because it interfered with their pecuniary in-

terests by causing restrictions in transport of freight and passengers. Thousands of lives were thus sacrificed to commercial selfishness. It was necessary that the representatives of the States should meet together and agree as State authorities upon a course of action. The North Atlantic seaports had escaped the necessity of having forced upon them these momentous issues, but the Gulf States had not been so fortunate on account of the regular recurrence of yellow-fever. They had been compelled to act together and had met in close alliance through a conference of the Boards of Health of the Gulf States and Tennessee. The various representatives made a pledge that immediately on the appearance of a single case or suspected case of yellow-fever they would give telegraphic notice to the other State boards. In three weeks after the meeting a suspected case was discovered in Louisiana, and its Board of Health, despite the protests of merchants, railway men, and others, faithfully carried out its pledge by sending notification to the other boards. The system had been attended with most beneficial results. Districts in which the fever had appeared had been isolated and corralled and the disease stamped out.

Dr. RAUCH moved, "That it is the opinion of this Association that in all cases passengers arriving from Europe, cabin passengers or not, should be examined to see that they have the necessary vaccine protection, even if a case of small-pox has not occurred on the voyage."

Dr. WIGHT, Detroit, thought the municipal authorities of each locality should supply the press with notices of fevers, etc., occurring.

The resolutions of the report and the above motion were referred to the advisory Council.

EVENING SESSION.

Dr. DAVID PRINCE, Jacksonville, Ill., read a paper on *An experimental study in relation to the removal from the air of the dust or particulate material supposed to produce yellow-fever, small-pox, and other infectious diseases.* His experiment was based on the following principle: Finding that air cannot be completely deprived of its floating material by water, attention has been given to the devising of a practicable plan for

purification by the passage of air through cotton. The capability of cotton of arresting all particulate material floating in the air is a remarkable discovery. Most interesting details of experiments to prove the power of cotton in arresting the agents of putrefactive changes may be found in the *Popular Science Monthly* for February, 1878, page 476, and March, 1878, page 501, in which the observations of Professor Tyndall upon this subject are related. The fact that a seal of cotton preserves any kind of material from decomposition, provided that the agents of decomposition are not already in it, shows —first, that these agents are not gases; for anything of a gaseous nature goes readily through cotton; and, next, this fact shows that gases do not initiate decomposition and that particulate material does. The problem now in hand is to secure the sterilization of air in motion, and which can have no boundary wall between it and the ordinary atmosphere. The use to be made of such air is (1st) to secure to a surface freedom from the influence of septic or pathogenic agencies, at the same time that it is being manipulated for surgical or other purposes; and (2d) to secure for living beings an air to breathe free from infectious agencies; or to take immediately away the products of exhalation from the lungs and other parts of the body. A portion of fruit may be sealed in a can by cotton or by solder, and it will keep indefinitely, but a breathing animal, to be free from septic or pathogenic agencies, when these agencies are round about him, must have some other arrangement by which his own exhalations may be carried away. If it is intended, in a particular case, to shield a person from the infection of yellow-fever in an infected location, the filtration of the air to arrest the particulate material of the infection must permit a perpetual change. This is secured in a great degree by respirators worn upon the face, which are usually made to sterilize the entering air and perhaps might be made to sterilize the air of expiration. To prevent a subject from taking a disease the filtration of the inspired air is required, and to prevent his imparting a disease the filtration of the air expired must be secured.

The writer then submitted a scheme based on these principles for sterilizing the air which enters a room for protection against infection, and one for sterilizing the air escaping from

a patient who is supposed to be afflicted with small-pox or some other infectious disease.

Dr. G. B. THORNTON, of Memphis, read a paper on *Six Years of Sanitary Work in Memphis.* He gave an interesting account of the reforms in sewerage, drainage, water supply, and removal of garbage in Memphis carried out during the last few years, resulting in a marked decrease of mortality and the prevention of yellow-fever epidemics.

Some supplementary information was given by Colonel Waring and Mr. Hadden.

Dr. Thornton's paper will appear in full in our pages hereafter.

The next subject called for was the—

Report of the Committee on the Disinfection of Rags, when the Association was taken quite aback for a few moments by the tactics of the rag importers, through the instrumentality of Colonel G. E. WARING, Jr. In a continuation of the effort to suppress the testimony, he moved, without waiting to hear a single word of the report, that it be laid on the table! But there were many present who knew something of the evidence of the danger of spreading infectious diseases by means of imported rags, who readily apprehended Colonel Waring's purpose, and who were also familiar with the train of influences which referred back the preliminary report of the committee on the necessity of disinfecting imported rags a year ago. His motion was not seconded, but deservedly characterized as an insult to the committee not only, but to the Association which had authorized the report. The report was urgently called for, though it was then past ten o'clock. It was read in abstract only by Dr. A. N. BELL (in the absence of the chairman of the committee, Dr. J. Howard Taylor), who stated at the outset that the interest of the subject could be readily accounted for when it was understood that the value of the rags imported into the United States during the fiscal year ending June 30th, 1886, amounted to no less than $5,194,951. With most of the evidences cited, showing the frequency with which small-pox, cholera, and other infectious diseases have been propagated by rags and their congeners, packed clothing, the readers of THE SANITARIAN are familiar. Colonel WARING stated as one of his reasons for

opposing the reception of a paper that he believed it to be designed to further a certain patent system of disinfecting rags. Dr. DEVRON warmly defended the committee from such an imputation. Dr. MCCORMACK denounced the imputation as an insult to the committee, and one which the character of the members of the committee did not warrant. Dr. HOLT said he had signed the report, and would do so again. He knew nothing about any little villainies, but he took a cold, scientific view of the question. Dr. HEWITT asked whether rags were not always considered a suspicious article. Dr. DURGIN, President of the Board of Health of Boston, and Dr. ABBOTT, Secretary of the State Board of Health of Massachusetts, seemed to labor under the impression that Dr. BELL'S observations, researches, and practical faith were all in the interest of steam as a disinfectant, opposed to the commercial interest of Massachusetts, and that, inasmuch as *under their* observation and practice steam was not a reliable disinfectant, rags should not be subject to the restrictions recommended by the committee. Dr. Abbott contended that the Committee had dodged the question, because, forsooth, it had attempted to show that rags, the filthiest of all out-throw of wearing apparel and textile fabrics of every kind, were equally liable to propagate infectious diseases with clothing—about which there was no question. Dr. Durgin dwelt particularly upon the failure of steam to do all that had been claimed for it, leaving the inference that for this reason there was no necessity for the severe restrictions against imported rags in particular, with regard to which he agreed with his associate, Dr. Abbott, there was no evidence that infectious diseases had ever been introduced into this country by them! His practice in Boston was to make a distinction between infected and non-infected rags. But with regard to the steam-heating process, he believed it to be "an infernal humbug."

Dr. BELL closed the discussion. He said a noise had been made recently about rags because they had only recently learned how to disinfect them. Rags, it is well known, have always been regarded as a fruitful source of infectious diseases; and they have rightly been subject to quarantine restrictions. The former practice was, and until the recent

advances in our knowledge of the nature of infectious diseases and the means of destroying them, to detain rags arriving at quarantine in summer until frost, and even then they were not unfrequently required to be kept in isolated store-houses for indefinite periods, but finally permitted *pratique*, to scatter disease and death. To the remarks of Drs. Abbott and Durgin he again called their attention to that portion of the report which he had just read, citing the evidence of the Massachusetts State Board of Health that the paper-mills of Holyoke had been a fruitful source of small-pox; the evidence collected by Health Commissioner Raymond, of Brooklyn, last year, showing that of a large number of paper-mills, both foreign and domestic, half of the proprietors thereof confessed to the common liability to infectious diseases of persons exposed to rags; the evidence of Dr. J. Howard Taylor, of Philadelphia, who reported two outbreaks of small-pox in Pennsylvania last year, traced to imported rags *vid* New York. Cholera, too, in proportion to its prevalence as compared with other infectious diseases—and other diseases causing far greater mortality than either small-pox or cholera—were also traceable to rags in such numerous instances by unquestionable testimony as to leave no room for doubt by any one who was not prejudiced by other influences than the protection of the public health. And with regard to the distinction between the danger of imported and domestic rags, the claim of exemption by the rag importers, and apparently accepted by Dr. Abbott, the proposition was absurd in the extreme, and could, perhaps, be most perspicuously presented by the simple statement that imported rags contain fifteen per cent of filthy "dirt." But the report of your committee, which has been read in abstract only, deals with the subject in detail. To Colonel Waring's base insinuation he only had to say, it can be accounted for on the ground that he doubtless measures other men by a self-conscientiousness of his own impulses and his well-known nefarious practices.

After more than an hour's discussion, the report was accepted. The appended preamble and resolution, and a resolution to have the report separately printed for extensive distribution, were referred to the Executive Committee. The Executive Committee subsequently reported the adoption of

the preamble and resolution as follows (adding to the resolution the last sentence beginning with If) :

Resolutions relating to the disinfection of rags, adopted by the American Public Health Association, October 8th, 1886.

Whereas, It is an admitted fact that the importation of rags is a prolific source for the spread of infectious disease, and that the seaboard cities which are ports of entry are the gateways through which this infection enters and is distributed throughout various sections of the country ; and,

Whereas, There are grave doubts as to the efficacy of the methods of disinfection used abroad ; therefore,

Resolved, That it is the judgment of the American Public Health Association that all health authorities having jurisdiction over matters connected with maratime sanitation owe it as a duty to the general public to adopt such systems of disinfection as will thoroughly destroy all disease-bearing germs before the rags are permitted to be distributed for manufacturing purposes. If it proves to be impracticable to disinfect them, it is recommended the disinfection may be commenced in quarantine sufficient to insure safety in transportation, to be completed in the manufacturing establishment by such methods as the health officers may prescribe.

It is understood that the report in full will shortly be issued in pamphlet for distribution among health authorities.

THIRD DAY.

Resolution of Sympathy.—On motion of Dr. A. L. GIHON :

"*Resolved*, That the members of the American Public Health Association send their fraternal greeting to their esteemed fellow-member, Dr. Thomas F. Wood, of Wilmington, N. C., Secretary of the State Board of Health of North Carolina, assuring him how much his absence has been felt and regretted, and of their warm sympathy for him in the illness which they earnestly hope may prove less serious than he has been led to believe."

The resolution was adopted by a standing vote, and ordered to be immediately transmitted to Dr. Wood.

Communications from State Boards of Health were next heard, and consumed most of the morning. On the conclusion of which—

Recent Progress in the Investigation of Hog Cholera was the subject of an interesting paper by Dr. D. E. Salmon, to be found in full on other pages of this number.

Report of the Committee on Disinfectants was submitted by Drs. STERNBERG and ROHÉ, containing drawings of various apparatus for the application of disinfectants. The use of superheated steam, the committee reported, was found most efficacious in destroying contagium.

Dr. HOLT, of Louisiana, exhibited a model of apparatus used in disinfecting merchandise and vessels at the Mississippi Quarantine, and made explanatory remarks on the efficacy of the means used—sulphur fumes, bichloride of mercury, and steam.

The afternoon was spent in an exceedingly interesting drive and view of the city, the university, and suburbs, coaches having been provided by the civil authorities.

EVENING SESSION.

The award committees on the Lomb prize essays reported that the papers and plans sent in by the several competitors were not of that degree of excellence which would justify them in awarding the prizes so generously placed at the disposal of the Association.

Dr. P. H. BRYCE, Toronto, read a paper on *Decomposition of albuminoid substances and some sanitary problems connected therewith.* He first pointed out that animal matter of all kinds was similar in composition, and that their decomposition results in similar products. This decomposition was due to bacteria feeding upon such substances. It was evident that in order to reduce the number of these latter, which were the cause of many diseases, it was necessary to lessen the amount of animal material upon which they feed. This indicated the absolute necessity which existed for inspection, among many other things, of our meat and milk supplies. In the case of the first it was evident that cattle markets and slaughter-houses should be under municipal control. Every animal to be slaughtered should be inspected prior and subsequent to slaughtering. In the case of market supplies, it was quite evident that not only all the animals should be inspected on the farms and in the stables, but that the milk shops dealing in

the product, the people who either handled the cows or lived in the houses on the farms, as well as those in the milk shops, should be under the strictest supervision. To that end Dr. Bryce urged the necessity of a committee of the Association being appointed to inquire into the whole matter during the coming year and to report at the next annual meeting.

Sanitation in Street Paving was the subject of a very interesting paper, to be found in full on other pages, read by Dr. J. E. Reeves.

The Sanitary Condition of Glasgow.—Dr. WILLIAM RUSSELL, Chairman of the Sanitary Department of Glasgow, Scotland, said: Scotland, taken as a whole, was one of the most benighted countries on the face of the earth in the matter of sanitation. The Public Health (Scotland) Act was passed in 1866, and while England and Ireland had frequently since that date had their Acts extended, amended, and consolidated, they in Scotland had remained twenty years behind. The chief explanation of such an extraordinary state of affairs was that one third of the entire population of Scotland was comprised of eight chief towns, which ranged from 540,000 to 30,000 inhabitants. The towns were the centre of sanitary energy for the simple reason that aggregation of population so intensified the fatal incidence of deteriorated physical conditions that their improvement speedily becomes a matter of necessity. Neglect meant extinction. These eight towns had local acts more or less advanced, but all far ahead of the organizations and powers of the National Act. It afforded him very great pleasure to be present at the meetings of the Association. He had listened to the different papers with pleasure and profit, and would carry back to his native land pleasant recollections of his visit to the annual meeting of the American Public Health Association.

Mr. A. BLUE, Toronto, read a paper on *Food in its relation to the distribution of wealth.*

Hygiene in Schools.—Dr. CHARLES W. COVERNTON, Toronto, read a paper by Dr. H. P. Yeomans, Ontario Board of Health, on the subject of *The best methods and apparatus necessary for the teaching of hygiene in the public schools, as well as the means for securing uniformity in such instruction.*

The Report of the Committee on Disposal of the Dead was laid

on the table in the absence of one of the committee to read it.

Mr. D. P. HADDEN, Mayor of Memphis, extended a cordial invitation from that city to the Association to meet in Memphis next year. The citizens of Memphis would be happy to welcome the Association to their city.

FOURTH DAY.

THE EXECUTIVE COMMITTEE submitted resolutions in regard to quarantine inspections for the *Prevention of small-pox*, and *for the disinfection of rags*—before cited.

The former resolution set forth that whereas there is an apparent diversity of usage at the different ports of arrival and entry as to the examination for vaccinal protection of cabin passengers, such probation being required within the seven years' limit in the St. Lawrence and not at all under ordinary circumstances at United States ports; and whereas it is desirable that uniformity of action in this important matter should obtain at all the ports along the entire seaboard, be it resolved, that it is the opinion of this Association that an examination as to the protection by vaccination of all passengers arriving from Europe, cabin passengers as well as others, should be exacted at all ports and in all cases, even if no cases of small-pox have occurred on the voyage.

The resolutions were adopted.

The next place of meeting was next considered and acted upon, and the invitation to Memphis, Tenn., accepted, the date to be fixed by the Executive Committee.

OFFICERS AND COMMITTEES.

The Advisory Council submitted the following nominations of officers for the ensuing year:

PRESIDENT—George M. Sternberg, Major and Surgeon U.S.A.

FIRST VICE-PRESIDENT—Dr. C. N. Hewitt, Red Wing, Minn.

SECOND VICE-PRESIDENT—Dr. C. A. Lindsley, New Haven, Conn.

TREASURER—Dr. J. B. Lindsley, Nashville, Tenn.

SECRETARY—Dr. Irving A. Watson, Concord, N. H.

EXECUTIVE COMMITTEE—Dr. H. B. Baker, Lansing, Mich.;

Professor H. A. Johnson, Chicago; Dr. Joseph Holt, New Orleans; Dr. G. H. Rohé, Baltimore; Col. D. P. Hadden, Nashville, Tenn., and Dr. Montizambert, Quebec.

COMMITTEES APPOINTED.

The PRESIDENT announced that he had appointed the following council and committees:

ADVISORY COUNCIL—The President (*ex-officio*); Alabama, Dr. Jerome Cochran, Mobile; Arkansas, Dr. H. C. Dunavant, Osceola; California, Dr. G. Tyrrell, Sacramento; Colorado, Dr. Charles Ambrook, Boulder; Connecticut, Dr. R. S. Goodwin, New Haven; Delaware, Dr. L. P. Bush, Wilmington; Florida, Dr. Robert B. S. Hargis, Pensacola; Georgia, Dr. W. H. Elliott, Savannah; Illinois, Dr. De Wolfe, Springfield; Indiana, Dr. J. D. Gatch, Lawrenceberg; Iowa, Dr. J. F. Kennedy, Des Moines; Kentucky, Dr. Pinckney Thompson, Henderson; Louisiana, Dr. L. F. Salomon, New Orleans; Maine, Dr. Frederick Gerrish, Portland; Maryland, Dr. W. C. Van Bibber, Baltimore; Massachusetts, Dr. S. H. Durgin, Boston; Michigan, Dr. J. H. Kellogg, Detroit; Minnesota, Dr. D. W. Hand, St. Paul; Mississippi, Dr. Wirt Johnston, Jackson; Missouri, Dr. R. Moore, St. Louis; New Hampshire, Dr. J. P. Conn, Concord; New Jersey, Dr. W. K. Newton, Paterson; New York, Dr. A. Mercer, Syracuse; North Carolina, Dr. Thomas F. Wood, Wilmington; Ohio, Dr. R. Harvey Reed, Mansfield; Pennsylvania, Dr. Benjamin Lee, Philadelphia; Rhode Island, Colonel George E. Waring, Newport; South Carolina, Dr. H. D. Fraser, Charleston; Tennessee, Colonel D. P. Hadden, Memphis; Texas, Dr. R. M. Sweringen, Austin; Vermont, Hon. Henry D. Holton, Brattleboro'; Virginia, Dr. J. G. Cabell, Richmond; West Virginia, Dr. C. T. Richardson, Charleston; Wisconsin, Dr. J. T. Reeve, Appleton; District of Columbia, Dr. W. Lee, Washington; United States Army, Surgeon G. R. Smith, Washington; United States Navy Medical Director, Albert Gihon, Washington; United States Marine Hospital Service, Surgeon-General J. B. Hamilton, Washington; Dominion of Canada, Dr. C. W. Covernton, Toronto; Ontario, Dr. William Oldright, Toronto; Quebec, F. N. Boxer, C.E., Montreal; Manitoba, Dr. W. K. Sutherland, Winnipeg.

PUBLICATION—Secretary (*ex-officio*), Dr. A. F. Holt, Boston; Dr. Grenville P. Conn, Concord, N. H.

STATE BOARDS OF HEALTH—Dr. P. Thompson, Board of Kentucky; Dr. Ezra M. Hunt, New Jersey; Dr. Fred. Gerrish, Maine; Dr. J. T. Reeve, Wisconsin; Dr. Joseph Holt, Louisiana; Dr. Thomas F. Wood, North Carolina; Dr. C. N. Metcalfe, Indiana; Dr. J. Tyrrell, California; Dr. P. H. Bryce, Ontario.

FORMS OF STATISTICS—Dr. J. S. Billings, Major and Surgeon U.S.A., Washington; Dr. S. W. Abbott, Wakefield, Mass.; Dr. H. B. Baker, Lansing, Mich.

ANIMAL DISEASES AND FOOD—Dr. D. E. Salmon, V.S., Washington; Dr. P. H. Bryce, Toronto; Dr. E. M. Hunt, Trenton, N. J.; Professor J. Law, Ithaca, N. Y.; Dr. C. M. Chancellor, Baltimore; Dr. J. H. Rauch, Springfield, Ill.; Dr. D. W. Hand, St. Paul; Lieutenant-Colonel J. R. Smith, U.S.A., San Antonio, Texas; Dr. John Fee, Kansas City.

DISINFECTANTS—G. M. Sternberg, U.S.A., Baltimore; Professor G. H. Rohé, Baltimore; Major Charles Smart, U.S.A., Washington; Professor V. C. Vaughan, Ann Arbor; Dr. Joseph Holt, New Orleans; Dr. J. H. Raymond, Brooklyn, N. Y.; Dr. Sam H. Duryea, Boston.

INCORPORATION—Dr. H. P. Walcott, Cambridge, Mass.; Dr. I. A. Watson, Concord; Dr. J. Berrien Lindsley, Nashville; Albert L. Gihon, U.S.N., Washington; Dr. J. H. Baxter, U. S. A., Washington; Dr. S. M. Browne, U. S. N., Washington; Dr. Smith Townsend, Washington; Dr. S. A. Robinson, Washington.

NECROLOGY—The Secretary.

POLLUTION OF WATER SUPPLY—Dr. Charles Smart, U. S. A., Professor Daniels, Wisconsin; Dr. Playter, Ottawa.

DISPOSAL OF GARBAGE BY FIRE—Dr. J. E. Reeves, Wheeling, W. Va.; Dr. Laberge, Quebec; Professor Brewer, New Haven; Professor Vaughan, Ann Arbor, and Commissioner of Health, Dr. Andrew Otterson, Brooklyn.

A hearty vote of thanks was passed to the various bodies which had extended courtesies to the Association.

The Association then adjourned *sine die*.

NEW MEMBERS elected during the meeting, about 100.

THE STATE BOARDS OF HEALTH CONFERENCE voted to continue its separate existence rather than, as proposed, as a section of the American Public Health Association, but as heretofore in co-operation with the Association, as above reported, and to hold its annual meetings at the same time and place. The officers elected for the ensuing year are as follows:

President, Dr. J. N. McCormack, Bowling Green, Ky.; Secretary-Treasurer, Dr. G. P. Conn, Concord, N. H. A committee consisting of Drs. L. F. Salomon, Louisiana; H. B. Baker, Michigan; and J. D. Plunkett, Tennessee, was appointed to report a plan of reorganization at the next meeting of the Conference.

WATER IMPURITIES—SOME SIMPLE TESTS.

Test for Hard or Soft Water.—Dissolve a small quantity of good soap in alcohol. Let a few drops fall into a glass of water. If it turns milky, it is hard; if not, it is soft.

Test for Earthy Matters or Alkali.—Take litmus paper dipped in vinegar, and if, on immersion, the paper returns to its true shade, the water does not contain earthy matter or alkali. If a few drops of syrup be added to a water containing an earthy matter it will turn green.

Test for Carbonic Acid.—Take equal parts of water and clear lime-water. If combined or free carbonic acid is present, a precipitate is seen, to which, if a few drops of muriatic acid be added, an effervescence commences.

Test for Magnesia.—Boil the water to a twentieth part of its weight, and then drop a few grains of neutral carbonate of ammonia into a glass of it, and a few drops of phosphate of soda. If magnesia be present it will fall to the bottom.

Test for Iron.—Boil a little nut gall and add to the water. If it turns gray or slate, black iron is present. 2. Dissolve a little prussiate of potash, and if iron is present it will turn blue.

Test for Lime.—Into a glass of the water put two drops of oxalic acid and blow upon it; if it gets milky, lime is present.

Test for Acid.—Take a piece of litmus paper. If it turns red there must be acid. If it precipitates on adding lime-water it is carbonic acid. If a blue sugar paper is turned red it is a mineral acid.

SOME RESULTS OF PRACTICAL SANITATION.—A recent number of the *Revue Scientifique* gives some important data illustrating the decrease in mortality rates consequent upon practical sanitation. According to these data the abolition of the system of temporarily depositing house-wastes in cesspools and vaults, subject to subsequent removal by the civic authorities, a system almost universally practised in Continental cities until within the last twenty years, has been followed by greatly diminished mortality generally, but particularly from typhoid-fever and kindred diseases. In Berlin, where the first attempts to improve upon the old system were made in 1875, the total annual mortality has been reduced nearly one fourth while that from typhoid-fever has been reduced one half. In Brussels, where cesspools were replaced by sewers in 1870, the mortality from typhoid-fever fell at once to about one third of its former rate, and is now about one fourth. In Frankford nearly similar results have been obtained; and in London, where such wastes are disposed of by the sewerage system, as compared with Paris, where most of the house-wastes are still received into cesspools, subject to subsequent removal, the ratio of deaths from typhoid-fever is 26 per 100,000 of population, and from diphtheria, 18, while the ratios in Paris from the same diseases are respectively 70 and 75 per 100,000 of population.

THE DESTRUCTIVENESS OF HEAT ON THE COMMA BACILLUS.—MM. Cornil and Babes, in their work, "Les Bacteries," state that the comma bacillus is destroyed by exposure to a temperature of 50° C. for a few days; also that a culture of comma bacilli can be sterilized by slowly heating it to 65° or rapidly to 75° C. At a recent session of the Academy of Science in Amsterdam, Professor Forster stated that he and Dr. Van Geins had found that the comma bacillus was destroyed by heating the substance containing it to 55° C.

MORTALITY AND MORBILITY STATISTICS AT MOST RECENT DATES.

ALABAMA.—No State Board report. *Mobile*, population 31,295, reports 110 deaths for the month of August, of which 57 were colored. Twenty-four were of children under five

years of age. The annual rate per 1000 was 42.12. There were 33 deaths from zymotic diseases and .. from consumption.

CALIFORNIA.—Reports for the month of August from all parts of the State indicate that little sickness prevails; indeed, twenty-six correspondents report that no deaths had occurred in their vicinity for over a month. We are therefore led to conclude that, as a rule, California at present is in a most salubrious condition and unscathed by epidemic disease. *Cholera infantum*, although still prevalent, as might be expected at this season of the year, is mentioned as present in Lemoore, Mariposa, Martinez, Etna, Alturas, Anaheim, Santa Rosa, and Davisville. *Diarrhœa and dysentery* seem to be the most prevalent of any diseases reported. They are mentioned as present in Red Bluff, Susanville, Fort Bidwell, Elk Grove, Modesto, Lemoore, Cloverdale, Lakeport, Martinez, Ione, Etna, Hill's Ferry, Alturas, Jolon, Truckee, Gridley, Bakersfield, Shasta, Grass Valley, Oakland, Stockton, Salinas, and San Francisco. *Measles* are reported in Salinas and Pope Valley. *Scarlet-fever* is reported in Weaverville, Truckee, St. Helena, Alturas, and Etna Mills. *Diphtheria* prevails to a limited extent in San Francisco, Oakland, Sacramento, Monterey, Santa Cruz, Mariposa, Martinez, San Diego, St. Helena, Etna, and Truckee. The difficulty of educating the public into the belief of the necessity of quarantining the sufferers from this disease is beyond comprehension. *Croup* is not mentioned as prevailing to the same extent as diphtheria, but many of the latter die from the disease invading the larynx wherever diphtheria prevails. *Whooping-cough* prevails in Colfax, Cloverdale, Lakeport, Martinez, Modesto, Truckee, Anaheim, Redding, Amador City, Nicolaus, San Diego, San Francisco, and Sacramento. *Erysipelas* is mentioned as present in a mild form in Lemoore, Martinez, Nicolaus, Wheatland, Truckee, and Calico. *Typhoid-fever* prevails in Goose Lake district, and is of rather a severe type. Dr. Fred. Hutchins, of Sierra City, reports cases of typhoid-fever in certain ill-drained districts of the town. Dr. Jump also reports typhoid-fever in Forest City, owing to some sanitary negligence. It is also reported in San Francisco, Petaluma, Fort

Bidwell, Elk Grove, Upper Lake, Etna Mills, Alturas, Igo, Oakland, and Santa Barbara. *Typho-malarial-fever* may be classed with typhoid, and is mentioned in each report with typhoid-fever. *Intermittent and remittent-fevers* prevail extensively throughout the State.

CONNECTICUT.—Reports from only nine of the cities of the State for August. No report from Middletown.

Total number of deaths registered in New Haven, 142; Hartford, 85; Bridgeport, 61; Waterbury, 74; Norwich, 55; Meriden, 31; New Britain, 35; Norwalk, 18; New London, 26—527, as against 525 in the same cities in July.

In public institutions there were 18 deaths in New Haven, 17 in Hartford. Deducting these from the full number reported gives the following as the annual death rate for the cities: New Haven, 18.6; Hartford, 17.7; Bridgeport, 18.3; Waterbury, 29.5; Norwich, 28; Meriden, 16.9; New Britain, 22.7; Norwalk, 14.4, and New London, 26.

Zymotic diseases killed, in New Haven, 43; Hartford, 27; Bridgeport, 27; Waterbury, 43; Norwich, 25; Meriden, 12; New Britain, 36; Norwalk, 11; New London, 12. Of the deaths under this head in New Haven 32 were caused by infantile diarrhœa. "Of 28 of the homes of these 32 deaths inspected, 27 had privies in use in the yard. In the only case in which there was none the deficiency was supplemented by overcrowding, there being 15 families in a block of tenements. In 22 of the 27 there were, in addition to the privies, the scarcely lesser abomination, the cesspool. In 6 of these the situation was rendered worse by untrapped sinks, and in 1 other by a leaky drain. In 13 of these 28 homes well water was the only supply, and every well was in close proximity to a privy and cesspool, often between the two. There were no other deaths from infantile diarrhœa reported to the registrar in August. Of the 32, the homes of 28 have been inspected, and it is on our record that 27 of the 28 were living over privy vaults and cesspools, and 13 of these drinking the soakage of these filthy pits from the other hole in the ground called the well. Comment on the above facts seems unnecessary. The most obvious and positive inference which these facts teach is that fatal infantile diarrhœa is limited to those who are ex-

posed to the exhalations of human excrement collected in masses in the ground, and that the larger portion of the population not so exposed are exempt from these intestinal disorders in a fatal form. That is the practical lesson of the mortality registration in New Haven in August."

DELAWARE.—No State Board report. *Wilmington*, estimated population 55,800, reports 65 deaths during August, representing a ratio of 13.98 per 1000. Twenty-three deaths were of children under five years of age. From zymotic diseases there were 16 deaths, and from consumption, 9.

ILLINOIS.—No State Board report received. *Rock Island*, with 11,650 inhabitants, reports for four weeks ending August 28th, 15 deaths. Of children under five years of age there were 9 deaths. Annual death rate per 1000, 11.7. From zymotic diseases there were 9 deaths, and from consumption none.

Chicago reports for August 1352 deaths in a population estimated at 704,000. Of children under five years of age there were 785 deaths. Annual death rate per 1000, 23.04. There were 521 deaths from zymotic diseases, and 91 from consumption.

LOUISIANA.—*New Orleans*, with a population of 238,000—173,500 whites and 64,500 colored—reports for the month of August 356 deaths of whites, showing a ratio per 1000 of 24.62, and 177 deaths of colored, showing a ratio of 32.93 per 1000; total deaths, 533, with a ratio per 1000 of 26.87. Of deaths under five years there were, of whites and colored, 177.

The deaths from zymotic diseases numbered 132—whites, 101; colored, 31. The deaths from consumption numbered 74, of which 39 were whites and 35 colored.

The "*Biloxi*-fever" has again cropped out, and with so much evidence of its true nature as, apparently, to fully justify the conclusions of the President and Secretary of the Louisiana State Board of Health in the first place, and to put to shame the health authorities of Harrison County, Mississippi, and the physicians who sustained them to the death of several victims. Under date of October 18th, we are informed, "the

railroad agent at Biloxi telegraphed the Board of Health, New Orleans, that there are 40 cases of fever in the city at present; that Dr. Lemon, who insisted that the disease was not yellow-fever at the outset, now states it is yellow-fever, his wife having died of it. Dr. Maybin and some others still declare it to be a 'fever of bilious type.' After hearing this testimony the Louisiana Board decided to establish a strict quarantine, and Dr. Holt telegraphed the health authorities of Harrison County, in which Biloxi is situated, that no person or baggage of any kind would be allowed to enter the State of Louisiana, and that this quarantine would never be raised until the said authorities invited the commission of yellow-fever experts from this city to visit Biloxi and decide as to the nature of the disease. It will be remembered that when Dr. Holt visited Biloxi at the outbreak of the fever some time ago and made a report to his Board that resulted in quarantine he was bitterly denounced by the authorities and people of Biloxi. When Dr. Godfrey, of the Marine Hospital Service, declared the disease to be of a malarious type, the feeling against Dr. Holt was intensified, and it was threatened that if he ever went to Mississippi he would be arrested for libel. On the strength of Dr. Godfrey's report and statements from the local Board that the disease had died out, the Louisiana Board raised the quarantine upon the district, understanding that should any suspicious case subsequently be found they would at once be notified. This promise was not kept, and hence the Louisiana Board will refuse to investigate the disease except at the solicitation of the local authorities, but will keep up strict quarantine. No incoming trains will be allowed to stop at any point in Harrison County."

MARYLAND.—No State Board report. *Baltimore* reports for four weeks ending August 28th, 712 deaths in a population of 417,220, representing an annual death rate of 22.1 per 1000. There were 361 deaths under five years of age. Deaths from zymotic diseases numbered 238, and from consumption 71.

MICHIGAN.—For the month of August, 1886, compared with the preceding month, the reports indicate that *diarrhœal diseases* increased, and that *neuralgia* and *bronchitis* decreased in prevalence.

The average of corresponding months for the eight years, 1879–86, the temperature and the absolute humidity were about the same, the relative humidity and the day and the night ozone were more.

Compared with the preceding month, the temperature in the month of August, 1886, was slightly lower, the absolute humidity was slightly more, the relative humidity and the night ozone were more, and the day ozone was about the same. Compared with the average for the month of August in the eight years, 1879–86, intermittent-fever, remittent-fever, influenza, consumption of lungs, dysentery, bronchitis, and typho-malarial fever were less prevalent in August, 1886.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of August, 1886, at 47 seven places, scarlet-fever at 28 places, typhoid-fever at 41 places, measles at 12 places, and small-pox at 2 places.

Reports from all sources show diphtheria reported at 12 places more, scarlet-fever at 6 places more, typhoid-fever at 24 places more, measles at 2 places more, and small-pox at the same number of places in August, 1886, as in the preceding month, July, 1886.

For the month of September, 1886, compared with the preceding month, the reports indicate that influenza, tonsillitis, and neuralgia increased, and that diarrhœal diseases decreased in prevalence. The average of corresponding months in the eight years, 1879–86, the temperature was about the same, the absolute and the relative humidity and the day and the night ozone were more.

Compared with the preceding month, the temperature in the month of September, 1886, was lower, the absolute humidity and the day ozone were less, the relative humidity and the night ozone were more.

Compared with the average for the month of September in the eight years, 1879–86, remittent-fever, intermittent-fever, typho-malarial-fever, bronchitis, consumption of lungs, and diphtheria were less prevalent in September, 1886.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of September, 1886, at 69 places, scarlet-fever at 30 places, typhoid-fever at 50 places, measles at 11 places, and small-pox at 3 places.

Reports from all sources show diphtheria reported at 22 places more, scarlet-fever at 2 places more, typhoid-fever at 9 places more, measles at 1 place less, and small-pox at one place more in September, 1886, than in the preceding month, August, 1886.

Detroit reports for the month of August 320 deaths in a population of 175,000, of which 91 were under five years of age. This mortality represents an annual death rate of 21.53 per 1000. There were 135 deaths from zymotic diseases and 26 from consumption.

MINNESOTA reports for the month of August: *Diphtheria*, 14 cases, 4 deaths; *scarlatina*, 8 cases. *Diseases of Animals:* Glanders remaining on hand isolated or not accounted for at first of month, 60 cases; reported during the month, 6; killed, 6; released, 23; isolated, 4.

For the month of September: *Diphtheria*, 6 cases, 5 deaths; *scarlatina*, 6 cases, 1 death. *Small-pox.*—Five cases of varioloid reported in a Norwegian settlement west of Northfield. "About the middle of July last, Egra Anderson, in travelling through Northern Iowa, put up for the night with a family in the backwoods of Worth County, two members of which family were reported to him to be sick with small-pox. Coming directly from there to Dundas, he came down with the first symptoms of the disease, about two weeks from his return, or eighteen days from date of (first) exposure. Date of attack, July 28th. About fifteen days later Ole Vesta, wife, and child aged six years, in whose house Anderson was boarding, were suddenly taken with same disease. Rigorous quarantine was at once instituted, the house placarded, neighbors warned, and all who had not previously been successfully vaccinated needed no persuasion in being so attended to. About August 30th a second child of Vesta's became sick. Anderson in the mean time having satisfactorily fumigated and disinfected himself and baggage, and having burned most of his clothing, removed to a neighboring shanty, and was given his liberty." Another imported case—this time from Iowa—into a country district. Discovered by adjacent Health Officer Dr. J. R. Phillips, of Dundas. One family of three infected. All others exposed promptly vaccinated. The sick recovered.

No new cases. *Diseases of Animals:* Glanders remaining on first of month, 35; reported during the month, 10; killed, 6; released, 4; isolated, 8.

St. Paul reports 183 deaths during August in a population of 120,000, representing an annual death rate of 17.30 per 1000. There were 108 deaths of children under five years of age. There were 101 deaths from zymotic diseases and 5 deaths from consumption.

Minneapolis, with a population of 129,200, reports for the month of August 193 deaths, of which 126 were under five years of age, representing an annual death rate of 17.81 per 1000 inhabitants. From zymotic diseases there were 55 deaths, and from consumption 14.

MISSOURI.—The State Board of Health has recently adopted a resolution regulating the practice of medicine in Missouri similar to that which obtains in Illinois, as follows:

Resolved, That in future a percentage of graduates to matriculates of forty-five (45) or over will be grounds for refusal of registration of diploma and issuing of certificate to graduates of a school otherwise in good standing; *provided*, however, that before such action is taken the said school whose diploma is presented for registration be notified, and an opportunity given the faculty thereof for satisfactory explanation to the State Board of Health.

NEW JERSEY.—No State Board report. *Hudson County* reports 533 deaths during August in a population of 250,734, making its annual rate per 1000 25.6. There were 286 deaths under five years of age. There were 143 deaths from zymotic diseases and 47 from consumption.

NEW YORK.—The total reported mortality of 124 cities and towns for August is 7142, of which 46.3 per cent were under the age of five years. From *zymotic diseases* there were 2244 deaths, a ratio of 314.20 per 1000 mortality. From *diarrhœal diseases* the ratio per 1000 is 207.78; from *typhoid-fever*, 14.56; from *croup and diphtheria*, 43.00. From *consumption* the ratio of mortality is 12.05 per 1000, and 224.80 per 1000 above the age of five years. The combined death ratio per 1000 from zymotic diseases, consumption, and puerperal dis-

eases is 442.60. From acute respiratory diseases there were 67.20 deaths per 1000. There have been 150 delayed returns received for July, 40 of which are of deaths under five years of age. In comparison with the mortality reported in July, the absence this month of that of the cities of Buffalo and Cohoes should be noted. The mortality of the two months, July and August, 1885, corresponds closely with that of this year.

New York City, with an estimated population of 1,439,000, had 3247 deaths, representing an annual rate of 26.50 per 1000. Deaths under five years, 1560—48.6 per cent of total mortality. The chief causes of death were: Diarrhœal diseases, 695; consumption, 443; acute respiratory diseases, 236; croup and diphtheria, 153; whooping-cough, 48; measles, 36; scarlet-fever, 15; typhoid-fever, 37; cerebro-spinal-fever, 16. Deaths from zymotic diseases 319.70 per 1000 of the deaths from all causes.

Brooklyn, with 690,000 inhabitants, had 1471 deaths, of which 749 were under five years of age; death rate per 1000, 19.20. From zymotic diseases per 1000 deaths from all causes, 331.70; 50.9 per cent of the total mortality was of children under five years. The chief causes of death were: Diarrhœal diseases, 316; consumption, 171; acute respiratory diseases, 116; croup and diphtheria, 88; whooping-cough, 36; scarlet-fever, 16; malarial diseases, 10; typhoid-fever, 13.

OHIO.—Bulletins for the two weeks ending September 25th, comprehending reports from 96 observers and 54 counties, aggregate the total number of deaths from all causes 376, of which 158 were of children under five years of age, and chiefly from *diarrhœal diseases*, which prevailed extensively throughout the State, though less than for weeks previously. *Diphtheria* reported present in 20 counties, and reports from other sources show this disease to be widely prevalent. Forty-seven cases of scarlet-fever reported in Cincinnati during the week ending September 25th, but no deaths reported. *Malarial-fever* prevalent and increasing.

PENNSYLVANIA.—No State Board report. *Philadelphia*, with an estimated population of 971,363, reports 1536 deaths for four weeks ending August 28th, of which 659 were under

five years of age. This mortality represents an annual death rate of 20.5 per 1000. From zymotic diseases there were 334 deaths, and from consumption 208.

Pittsburgh reports for the four weeks ending August 28th, 393 deaths in a population estimated at 200,000, of which 237 were under the age of five years. From zymotic diseases there are reported 90 deaths, and from consumption 20. Annual rate, 25.2.

Erie, with an estimated population of 33,215, reports for the month of August 54 deaths, of which 34 were under five years of age. Annual death rate per 1000, 16.09. From zymotic diseases there are reported 27 deaths, and from phthisis 3 deaths.

RHODE ISLAND.—No State Board report. *Providence* reports for August 268 deaths in a population estimated at 120,000, of which 120 were less than five years of age. This mortality represents an annual death rate of 26.8 in 1000 of population. Of the causes of deaths, there were from zymotic diseases 97, and from consumption 34.

TENNESSEE.—*Bulletin* for the month of August reports less sickness than would be looked for in the Dog-star month. A number of counties report excellent health; some few, unusual sickness; the majority note bowel derangements and diseases caused by malaria. The principal diseases, named in the order of their greater prevalence in the State for August, were: *Dysentery*, *malarial-fever*, *typhoid-fever*, *bilious-fever*, *diarrhœa*, *cholera infantum*, *consumption*, and *cholera morbus*.

Whooping-cough is reported in the counties of Gibson, Hancock, Houston, Humphreys, Knox, Maury, Obion, Stewart, Williamson, and Wilson; *diphtheria* in Davidson, Haywood, Hamilton, Knox, McMinn, Stewart, and Shelby; *scarlet-fever* in Davidson and Madison; *measles* in Davidson and James. One case of *dengue-fever* is reported in Shelby County.

Death Rates.	Chattanooga,	white,	19.76 ;	colored,	34.90 :	25.71
" "	Clarksville,	"	4.80 ;	"	20.00 :	10.50
" "	Knoxville,	"	6.05 ;	"	48.00 :	14.96
" "	Memphis,	"	20.88 ;	"	43.32 :	28.80
" "	Nashville,	"	11.54 ;	"	27.19 :	17.11

Meteorological features for the month: The mean temperature was 75° 6′, which was about the same as that for the corresponding period of last year, and respectively 2° and 3° above that for the same month in 1884 and 1883. The highest temperature was 103°, on the 17th, and was 1° above the maximum recorded last year, which was the highest point reached since the establishment of the State weather service. The lowest temperature was 52°, on the 31st. This was 2° above the minimum of August of last year, 4° above that of August, 1884, and 9° above that of August, 1883. During the first decade of the month there was a period of low temperature ending with the 9th.

The mean precipitation was 4.05 inches, 1.75 inch above the mean of August of last year, and nearly 2 inches above that of August, 1884. Of this amount, the Eastern Division received an average of nearly 4½ inches, the Middle Division received nearly 3¾ inches, and the Western Division about 4 inches. The greatest rainfall was 8.28 inches reported at Riddleton, and was the greatest for the month of August of any of the preceding years recorded by the State weather service, the next greatest being in 1883, when 6.38 inches were recorded.

VIRGINIA.—No State Board report. *Richmond* reports for August 170 deaths—87 white and 83 colored. The white population, estimated at 42,000, and the colored at 33,000, show the respective death rates to be 24.86 and 30.18 per 1000, and for the whole city 27.20. There were 84 deaths under five years of age. Zymotic diseases caused 32 deaths of whites and 10 deaths of colored, and consumption caused 8 deaths of whites and 13 deaths of colored.

Lynchburgh reports for three weeks ending August 21st, white population, 9420; colored population, 11,000; total, 20,420. Deaths, 29—11 white, 18 colored. Rate per 1000, white, 20.1; colored, 28.3; total, 24.5. Deaths under five years of age, 9. From diarrhœal diseases 2 deaths, and from consumption 9 deaths.

WISCONSIN.—No State Board report. *Milwaukee* estimates its population at 160,000. During the month of August there were 325 deaths, of which number 128 were under the age of five years. The annual death rate per 1000 represented by

these figures is 23.35. One hundred and twenty-two deaths were from zymotic diseases and 16 from consumption.

MORTALITY STATISTICS ABROAD, and the annual death rates per 1000 at the most recent dates of cities containing 100,000 inhabitants and upward. Of 14 large English cities the average annual rate for the week ending *September 25th* was 22.7. The lowest rate was in London, 16.0, and the highest in Sheffield, 28.4. Paris, 20.2; Havre, 23.2; Rheims, 29.7; Nancy, 18.4; Breslau, 32; Cologne, 32.6; Brussels, 28; Anvers, 29.3; Liège, 25.6; average cities of Belgium of from 10,000 to 50,000 inhabitants, 24.9; Bale, 19.2; Geneva, 12.1; Berne, 12.8; Lausanne, 19.4; Zurich, 5.7; Trieste, 47.2; Christiania, 20.6; Bucharest, 30.7. For the week ending *September 18th:* Amsterdam, 23.4; Rotterdam, 28.7; Hague, 30.4; Lyons, 23.8; Berlin, 36.1; Hamburg, 34.9; Munich, 37.9; Dresden, 32.8; Leipzig, 23.8; Frankford, 21.9; Koenigsberg, 34.4; Magdeburg, 26.9; Bremen, 29.3; Düsseldorf, 32.1; Dantzig, 29; Nuremberg, 31.3; Stuttgart, 18.7; Strasburg, 39; Chemnitz, 44.1; Elberfeld, 26.4; Altona, 31.8; Barmen, 15.1; St. Petersburg, 24.3; Warsaw, 28.7; Odessa, 42.3. Week ending *September 9th:* Cairo, 44.5; Alexandria, 42.5; Barcelona, 22.8; Turin, 17.3. For the *month of August:* Marseilles, 32.8; Bordeaux, 24.1; Nantes, 24.6. Week ending *August 24th:* Bombay, 22.6. Week ending *August 13th:* Madras, 37.0. Week ending *July 31st:* Calcutta, 20.8. Week ending *July 24th:* Rome, 24.0. Month of *June:* Buenos Ayres, 24.4.

INFECTIOUS DISEASES ABROAD, deaths reported at most recent dates, as follows:

Cholera.—During the month of August: Marseilles, 5; Lyons, 1; Bordeaux, 1; Besançon, 18. During the two weeks ending September 25th: Buda Pesth, 99. During the week ending September 25th: Trieste, 27; Feume, 7. September 5th–10th: Province of Ferrara, 131. September 6th–10th: Province of Padua, 103. September 13th–15th: Raab, 16. September 5th–11th: Venice (city of), 14; Province of, 21. September 3d–10th: Province of Côme, 9; Province of Mantua, 5. August 30th–September 2d: Bologna, 25. August

22d–September 2d : Province of Pavia, 68. August 17th–22d : Portalhera, 47. During the week ending July 31st : Calcutta, 24. According to recent telegraphic announcements, cholera was prevailing in Corea with great fatality. A despatch from Vienna under date of October 18th states that Herr Schmidt, State Director of Railways, arrived October 16th in Vienna from Pesth, and died of cholera the next day, which it is believed he contracted in Pesth, where the disease exists. Seven persons died of cholera in Szegedin, Hungary, during the 24 hours ending October 17th, and 19 new cases of the disease were reported in the town.

Small-pox.—During the month of August : Marseilles, 106 deaths—cases not reported ; Saragossa, 12 deaths. September 12th–18th : Buda Pesth, 35 deaths. Month of July : Milan, 29 deaths. During the months of August and September, deaths from 1 to 10 of small-pox in the following cities : Paris, Bordeaux, Rheims, Nice, Vienna, St. Petersburg, Warsaw, Brussels, Hamburg, Prague, Odessa, Rome, Cairo. Month of June : Buenos Ayres, 60.

Diphtheria was particularly prevalent during the month of September in London, Paris, Marseilles, Berlin, Hamburg, Christiania, Warsaw, Milan, Cairo, and Granada ; and less prevalent—from 1 to 10 deaths weekly—in Liverpool, Glasgow, Birmingham, Dublin, Manchester, Sheffield, Edinburgh, Bristol, Newcastle, Utrecht, Lyons, Bordeaux, Nantes, Saint-Étienne, Havre, Nice, Limoges, Breslau, Munich, Dresden, Leipzig, Cologne, Frankford, Dantzig, Nuremberg, Stuttgart, Altona, Mayence, Vienna, Buda Pesth, Prague, Trieste, Cracow, Copenhagen, Stockholm, St. Petersburg, Odessa, Turin, Livourne, Barcelona, Saragossa, and Bucharest.

Measles was particularly prevalent during the month of September in London and Paris, causing 10 to 15 deaths weekly, and from 1 to 5 deaths weekly in Liverpool, Glasgow, Leeds, Sheffield, Edinburgh, Bristol, Amsterdam, Rotterdam, Hague, Lyons, Marseilles, Nantes, Saint-Étienne, Berlin, Hamburg, Breslau, Dresden, Elberfeld, Vienna, Buda Pesth, Prague, St. Petersburg, Odessa, Milan, Turin, and Grenada.

Scarlet-fever, during the month of September, caused from 10 to 20 deaths weekly in London, Hamburg, Buda Pesth, St. Petersburg, and Odessa ; and from 1 to 9 deaths weekly in

Liverpool, Glasgow, Dublin, Manchester, Leeds, Sheffield, Edinburgh, Newcastle, Rotterdam, Utrecht, Paris, Bordeaux, Berlin, Breslau, Munich, Leipzig, Cologne, Magdeburg, Hanover, Dantzig, Chemnitz, Vienna, Prague, Trieste, Cracow, Copenhagen, Stockholm, Christiania, Warsaw, Milan, Granada, and Bucharest.

Whooping-cough, during the month of September, caused from 10 to 20 deaths weekly in London, Glasgow, Paris, Hamburg, St. Petersburg, and Cairo; and 1 to 9 deaths weekly in Liverpool, Manchester, Leeds, Sheffield, Bristol, Hull, Amsterdam, Rotterdam, Hague, Lyons, Marseilles, Bordeaux, Nantes, Rheims, Nancy, Breslau, Munich, Cologne, Bale, Copenhagen, Stockholm, Milan, Livourne, and Bucharest.

Typhoid-fever, during the month of September, caused from 17 to 10 deaths weekly, in the order of greatest numbers as follows:—In London, Paris, Barcelona, Cairo, St. Petersburg, and Lyons; and from 1 to 10 weekly in Liverpool, Glasgow, Manchester, Leeds, Sheffield, Edinburgh, Belfast, Bristol, Hull, Newcastle, Utrecht, Bordeaux, Saint-Étienne, Havre, Nancy, Nice, Besançon, Berlin, Hamburg, Munich, Koenigsberg, Magdeburg, Bremen, Strasburg, Altona, Mayence, Buda Pesth, Prague, Trieste, Copenhagen, Stockholm, Warsaw, Odessa, Milan, Turin, Bucharest, Cairo, and Alexandria.

Fevers, from July 25th–31st, in Calcutta caused 49 deaths; in Madras, August 7th–13th, 79 deaths; in Bombay, August 18th–24th, 92 deaths.

ANNUAL REPORTS.

FRANCE.—Movement of the population for the year 1885, as recently reported to the Hygienic Exhibition in Paris by M. Bertillon: Births, 922,361—30,000 fewer than the average for the last 15 years. Of the total number 74,118, or rather more than 8 per cent, were illegitimate. Deaths, 836,897—85,464 less than the number of births.

BOSTON, MASS.—Annual Report of the City Registrar, N. A. Apollonio, for the year 1885. There has been a good deal of controversy in Boston recently on the question of population. But the city census of 1885 shows that the increase since 1880 (on 362,839) has been only 1.51 per cent

yearly, and the population 387,183 instead of 427,940, which had before been reported for 1885 as a basis for vital statistics.

Births registered for the year, exclusive of 523 still births, 11,496, an increase of 17 only over the preceding year, "which," says the registrar, "shows that there was born one living child to each 33.96 of the entire population. In 1850 and 1855 (both census years) the birth rate was 1 in 26.20 and 27.46 respectively." Reference is made to a recent paper by Dr. Nathan Allen on the "Laws of Maternity" (*New England Medical Monthly*), in which Dr. Allen states: "It is well known that the birth rate in New England has fallen off surprisingly within fifty years. . . . The birth rate of France is the lowest of any European nation, but ours is lower than even the French—the lowest of any civilized people on the globe." As this condition is that of the native population only, the question that Dr. Allen asks is a significant one: "Now, what does this low birth rate mean, and how can it be explained?" Of the 523 still births, the ratio to population were: Native, 1 in 17.64; Irish, 1 in 19.46; English, 1 in 26.53; Scotch, 1 in 42.23; British American, 1 in 22.24; German, 1 in 36.89; Italian, 1 in 27.40; Portuguese, 1 in 27.50. The statistics of birth among the colored portion of the population for the year exhibit the usual peculiarity—more numerous than the deaths. There was 1 to each 33.88 of the population.

Marriages recorded, 4717—1 in 41.38 of population. As compared with previous years, shows a continuous decrease, though 93 more than for preceding year. Taking the census years: Ratio in 1850, 1 in 27.32; 1855, 1 in 27.69; 1860, 1 in 33.25; 1865, 1 in 34.00; 1870, 1 in 33.65; 1875, 1 in 46.00; 1880, 1 in 45.35; 1885, 1 in 41.38.

Mortality, 9622; rate per 1000, 24.64; 1975, or 20.5, were killed by zymotic diseases, the chief of which were: Diarrhœal diseases, 777; croup and diphtheria, 475; typhoid-fever, 68; scarlatina, 146; measles, 86; 1579, or 16.41 per cent of the whole mortality, was caused by consumption.

CHICAGO.—Report of the Health Department for the year 1885, Oscar C. De Wolf, M.D., Commissioner of Health.

The "character of population in respect of age being taken

into account," the Commissioner remarks, "Chicago may justly claim to be the healthiest large city on the continent, and the past year, 1885, the healthiest in its history since any record of its vital statistics began to be kept."

Estimated population and death rate per 1000 as follows:

Under five years, 89,724; per cent of total, 13.5; deaths, 6187; rate per 1000, 68.9.

Between five and ten years, 498,620; per cent of total, 75; deaths, 4262; rate per 1000, 8.5.

Over fifty years, 76,290; per cent of total, 11.5; deaths, 2025; rate per 1000, 26.5.

Total population, 664,634; deaths, 12,474; rate, 18.7.

Next follows a statement of the result and a comparison of the death rate of Chicago with 31 registration cities (U. S. Census 1880) grouped, as above for Chicago, 1885, with death rates per 1000, as follows:

Under five years, 88.4; between five and ten years, 9.6; over fifty years, 39.4; total, 22.2.

"The increasing healthfulness of Chicago" is viewed from several standpoints. For the five years previous to 1885 the average annual rate was 21.8. In 1880 (census year), 20.8; 1881, 25.7; 1882, 23.6; 1883, 19.9; 1884, 19.8. In 1881–82 an epidemic of small-pox prevailed.

The death rates from zymotic diseases for each year since 1880 per 1000 of population as follows: 1880, 6.62; 1881, 7.80; 1882, 8.00; 1883, 5.26; 1885, 4.82. The actual number of deaths from zymotic diseases in 1885 was 3210, or 25.7 per cent of the total mortality. Small, therefore, as the general death rate appears to be, the ratio from zymotic diseases (even outside of the years 1881–82, when small-pox prevailed) is relatively—to healthy cities—large. Notwithstanding in this respect, as in the total mortality, the increasing healthfulness of Chicago is apparent; for, as pointed out by the Commissioner, while the relative decrease from all causes in 1885, as compared with 1884, was 683, the decrease in deaths from zymotic diseases in a total of 3210 was 485. That is, "while the reduction in the general death rate was 5.4 per cent, in the class of causes most directly under the control of the sanitarian, it was over 15 per cent." There are some discrepancies in the figures of the Commission and the

Registrar of Vital Statistics, which give slightly different results.

The number of deaths from typhoid-fever (496) and typho-malarial-fevers (79) is in particular large, and abundantly suggestive of considerable room for continuous decrease in the death rate.

ONTARIO.—The Fourth Annual Report of the Board of Health, for 1885, is a portly pamphlet of 169 pages. The first 64 pages are taken up by the Secretary of the Board, Dr. P. H. Bryce, with a detailed account of the small-pox epidemic and a summary of the work of the Board during the year. As an introduction to the history of the epidemic, it is important to notice that during the years 1872–74, before the existence of the Provincial Board of Health, or, indeed, any local Boards of Health except committees of councils, there were in 29 counties of Ontario 775 cases of small-pox, with 371 deaths, without any known special centre of the infection ; and, inferentially, without any efficient destruction of fomites. In 1883–85 there were, in *Ontario*, 250 cases, and the total deaths 84. The Provincial Board was organized in May, 1882. The Secretary well remarks :

" There is nothing in the whole history of small-pox during the year which will illustrate the advantages which attach to the establishment, under compulsion, of local Boards of Health, and, under the presence of contagious disease, of the appointment of medical health officers, the whole being in intimate relations with a central health authority, so well as does the foregoing comparison."

Our reports of the epidemic in Montreal and vicinity during its prevalence were so full as to render any further review unnecessary. It will suffice to state that the number of deaths from small-pox in Montreal from June to December, 1885, was 3175. That, in addition to vaccination and general surveillance over both persons and articles of commerce, " ready-made clothing came within the inspection of merchandise, and the shipment of rags, which must always be considered a danger of the most positive kind, was entirely prohibited," were the most efficient measures used by the Board of Health to prevent the introduction and spread of the disease in Ontario.

Of other infectious diseases, *measles*, *diphtheria*, and *typhoid-fever* appear to have been most prevalent. Of *scarlet-fever* and *whooping-cough* there have been localized outbreaks, but no serious epidemics. Several illustrative examples are given of the spread of typhoid-fever through the neglect of its common relations to the filthiest of all filth, and of the use of disinfectants to alvine discharges, and of insufficient care in guarding the milk supply with relation to all infectious diseases.

Slaughter-house and factory nuisances are among the chief subjects of constant warfare throughout the Province, as in this country, and local Boards of Health are urged to unremitting vigilance against these common sources of infectious diseases.

Appended are special reports on the conclusions of the State Boards of Health Conferences in St. Louis and Washington, 1884–85; Poisons; Sewage Investigation; Epidemics; Typhoid-fever; Establishment of Vaccine Farm; Advisability of Taking Precautions to Prevent Infanticide in this Province, and Means of Lessening the Mortality Among Foundlings; Maritime and Land Sanitation; Cemeteries, and an Epitome of Reports of Local Boards. These reports cover a large field of inquiry and present much practical knowledge.

WORCESTER, MASS., Board of Health reports for the year ending November 30th, 1885, the number of deaths from all causes, 1394—19.9 per 1000 (population, 70,000). Of the total number, 289, or 20.7 per cent of the whole, were caused by zymotic diseases, the chief of which were diarrhœal diseases, diphtheria (and croup), and typhoid-fever; and the chief nuisances with which the Board of Health had to contend were foul privies and cesspools, defective plumbing, and imperfect drainage.

YONKERS, N. Y.—Annual reports for the years 1883, 1884, and 1885, Valentine Browne, M.D., Health Officer. These reports show, without apparent intention, the continued benefit of practical sanitation. In 1883 the total mortality from all causes was 405; 116, or 26 per cent, died of zymotic diseases, and of these 17 were enteric-fever. In 1884 and in 1885 the totals were, respectively, 350 and 450, and from zymotic diseases, 83, or 23.7 per cent, and 114, or 25.3 per cent, and of each of these years the deaths from enteric-fever

were 2. The population of Yonkers was, in 1880, 19,000. Since that time 650 new houses have been erected, two thirds of which have been tenanted. Reckoning 8 persons to each, the present population is estimated to be not less than 24,000, and the death rate not more than 18.75 per 1000. The specially notable feature is the almost complete abatement of enteric-fever. For the foul conditions which gave rise to it, and the means used for killing it, the reader is referred to a previous notice of the report for the year 1883 (Vol. XII., p. 561). But the percentage of mortality from other filth diseases is still high, and the sewerage incomplete.

MEMPHIS, TENN.—Water Committee Report on a Public Water Supply, February 23d, 1886. This report of seventy-two pages and a map fully recognizes Memphis' greatest need with a view to her future welfare. No one knows better than the people of Memphis, and this committee in particular, the danger of an impure water supply, and it is surprising, notwithstanding the weight of the city debt, that this danger has been so long tolerated. No city debt was ever incurred under more dire necessity than that of Memphis, but no one relic of the past in bringing about that necessity is fraught with so much risk of reviving it as the impure water supply, which it is the object of this report to get rid of.

Much of the report is devoted to the consideration of the ability of the city to sustain a needful water debt in addition to already existing burdens. But the ability to maintain a water debt when weighed against the most fruitful source of all debts is too well known to the people of Memphis to leave any room to question the right choice of burdens in this case. In a summary of the cost of different plans for procuring a supply, there is possible reason to fear that *purity* has not been estimated at its full value. Just in proportion as this is approached, all the costly paraphernalia pertaining to filtration and other artificial means of purification may be dispensed with ; and it is safe to say that exceptions are extremely rare when that which is purest naturally is not the most economical in the long run, as well as the best at the outset.

THE NEWPORT SANITARY PROTECTION ASSOCIATION, at its annual meeting, July 14th, through the summary of the Recording Secretary, Dr. William C. Rives, reviewed the diffi-

culties it had encountered and obstacles overcome in its progress —the establishment of a local Board of Health and the adoption of a system of sewerage. But it regrets the limited power of the former, the incompleteness of the latter, and the general apathy of the public in regard to the subject which of all others most concerns the welfare of the city—a thorough sanitary condition.

"Several outbreaks of infectious disease have occurred, which have further emphasized the necessity for a suitable building for such cases, especially as there is a good deal of recklessness and want of consideration for others exhibited by many persons, in neglecting necessary precautions against the spread of contagion; but the need of a satisfactory locality where such a structure could be built still exists, although efforts have been made to secure one.

"An intention has been shown by the executive department of the city to enforce many existing sanitary rules which have been too long neglected, and at the suggestion of the Board of Health the new regulations have been made. The mayor has given his hearty sympathy and assistance to the Board of Health, which it is hoped will more and more effectively deal with the health problem of the city."

THE PRISON ASSOCIATION OF NEW YORK reports for 1885 a year of continuous labors and anxieties, and results equal to other years. Eight hundred and eighty-five discharged prisoners who have called at the rooms of the Association and there registered have been assisted with advice, lodging, clothing, tools, or money, according to their needs. A number of illustrative cases are cited showing that the assistance afforded by the Association in various ways has been worthily bestowed. A special committee on Convict Labor reports strongly against the contract system as being essentially unfavorable to reformation, because it fails to appeal to the motives to which alone any reformatory influences of labor must appeal. It regards and treats the convict as a slave, or a live chattel, in the service of the State, and it asserts the right of the State to use the convict or hire him out to others to be used, as it might do with a horse or an ox, for the profit of the public treasury. Conversely, the Public Account system, by which the convict becomes closely analogous to

that of the employer to employé, is approved of as the best. The piece-price plan is also considered, and preferred under certain exceptional circumstances. The different plans are comprehensively treated, and the conclusions to which the committee arrives logical, as follows:

"*Resolved*, That the highest test of excellence in any system of convict labor is to be found in the adaptability of that system to promote the end of the convict's reformation.

"*Resolved*, That the contract system, in principle and in practical methods, is inconsistent with those forms of discipline and treatment that are most conducive to the prisoner's reformation, and should, therefore, be condemned.

"*Resolved*, That the best and most natural method of employing convict labor is in the manufacture of supplies for use in institutions supported by the State, and in such other public work for the use of the State as can be carried on in confinement; and that, so far as such public work can be provided, the State prisoners should be employed on the same under the public account system of labor.

"*Resolved*, That all State prisoners for whom such public work as is mentioned in the last preceding resolution cannot be provided should be employed upon the piece-price plan of labor."

The objects of the Association are stated in its charter, and its annual reports, of which this is the forty-first, clearly show its practical beneficence. It maintains a constant supervision of the penal institutions of the State, and has secured many improvements in prison discipline. Through its counsel, guidance and material aid more than 50,000 persons have been assisted. W. M. F. Round, Corresponding Secretary, 65 Bible House, New York.

OBITUARY.

PROFESSOR RIPLEY NICHOLS, of the Massachusetts Institute of Technology, Boston, died in Hamburg, Germany, July 14th, 1886, aged about forty years. He was a distinguished analytical chemist, particularly of water, in which he obtained a well-deserved reputation. He was also the author of a number of scientific essays, and the author of several excellent scientific text-books. He was abroad at the time of his death, with the hope of gaining relief from pulmonary disease, with which he had been a sufferer for several years.

LITERARY NOTICES.

INDEX CATALOGUE OF THE LIBRARY OF THE SURGEON-GENERAL'S OFFICE, U. S. ARMY, AUTHORS AND SUBJECTS, VOL. VII., INSIGNARÈS-LEGHORN. Compiled under the direction of John S. Billings, Surgeon, U. S. Army. Like the preceding volumes of the same series, it is replete with information according to title. "This volume includes 14,688 author-titles, representing 5937 volumes and 12,372 pamphlets. It also includes 6371 subject-titles of separate books and pamphlets, and 34,903 titles of articles in periodicals."

THE HYGIENIC TREATMENT OF CONSUMPTION is the subject of an unusually interesting article in the November number of the *Popular Science Monthly*, by Dr. Benjamin Ward Richardson. The paper consists of ten simple rules of living, with full explanations of the reasons for them, which any one of ordinary capacity can understand. They may be followed with or without the aid of a doctor, with the certainty of salutary results, where the present methods of treatment usually end in death.

ELECTROLYSIS, ITS THEORETICAL CONSIDERATION AND ITS THERAPEUTICAL AND SURGICAL APPLICATIONS. By ROBERT AMORY, A.M., M.D., Member of the Massachusetts Medical Society; Fellow of the American Academy of Arts and Sciences; Fellow of the American Academy of Medicine, etc. Octavo, 314 pages. Illustrated by nearly one hundred fine wood-engravings. Supplied only to subscribers for "Wood's Library of Standard Medical Authors," for 1886 (12 vols., price $15), of which this is Vol. VIII.; and

RHEUMATISM: ITS NATURE, ITS PATHOLOGY, AND ITS SUCCESSFUL TREATMENT. By T. J. MACLAGAN, M.D. Octavo, 285 pp., illustrated. Supplied only to subscribers for "Wood's Library of Standard Medical Authors," for 1886 (consisting of 12 vols., price $15), of which this is Vol. IX. New York: William Wood & Company.

These, the August and September volumes, current series,

sustain in an eminent degree the excellence of "Wood's Library of Standard Medical Authors." Dr. Amory's work, especially, differs from previous works on the same subject in that it comprehends the principles of physics as applicable to electrolysis as a prerequisite of essential knowledge to an intelligent application of electricity in the treatment of disease.

Dr. Maclagan's work comprehends a collation of the best practical observations of much that has been written on rheumatism, thoroughly analyzed and elucidated with a view to the best practical results. The miasmatic theory of rheumatism, in particular, is lucidly expounded, and an explanation offered of the manner in which the salicyl compounds produce such marked effects in the treatment of the disease.

HOW TO STRENGTHEN THE MEMORY; OR, NATURAL AND SCIENTIFIC METHODS OF NEVER FORGETTING. By M. L. HOLBROOK, M.D. Price $1. New York: M. L. Holbrook & Co.

This is a very useful book for students and readers who would profit by the experience of some of the best observers, and reap the fullest benefit from their studies. The mechanical portion of the book is excellent, in good keeping with the text.

A LABORATORY GUIDE IN URINALYSIS AND TOXICOLOGY. By R. A. WITTHAUS, A.M., M.D., Professor of Chemistry and Physics in the University of the City of New York; Professor of Chemistry and Toxicology in the Medical Department, University of Vermont; Professor of Chemistry and Toxicology in the Medical Department, University of Buffalo; Professor of Pharmaceutical Chemistry in the Department of Pharmacy, University of Buffalo; Chemist to the City of Buffalo; Chemist to the New York State Dairy Commissioner; Member of the American Chemical Society, and of the Chemical Societies of Paris, Berlin, etc. New York: William Wood & Co.

An admirably arranged manual of great practical utility to every medical practitioner.

DISEASES OF THE STOMACH AND INTESTINES. A MANUAL OF CLINICAL THERAPEUTICS FOR THE STUDENT AND THE PRACTITIONER. By Professor DUJARDIN-BEAUMETZ, Phy-

sician to the Couchin Hospital; Member of the Academy of Medicine and of the Council of Hygiene and Salubrity of the Seine; Editor-in-Chief of the *Bulletin Général de Thérapeutique*, etc. Translated from the Fourth French Edition by E. P. Hurd, M.D., President of the Essex North District Medical Society, Member of the Massachusetts Medical Society and of the Climatological Society; one of the Physicians to the Anna Jaques Hospital, Newburyport, Mass. Illustrated. New York: William Wood & Co.

This (the May volume of "Wood's Library of Standard Medical Authors," current series) is a hygienico-medical treatise on a class of diseases which more frequently than any other claims the attention of every medical practitioner. Dyspepsia alone, in its various forms, occupies about one fourth of the volume, and this with but very little attention to the pathology of the disease; indeed, as the author prefatorily remarks, it is less a treatise on the pathology of those affections than on the treatment to which, in fact, all other considerations are made subordinate. But this is preceded by six unusually interesting chapters on alimentary principles, aliments, alimentation, regimen, lavage and gavage of the stomach. Hygienic treatment throughout, as well of those diseases which appertain to the intestinal track as of the stomach, is a prominent feature, and one which will not fail to attract the attention of the reader as being the foremost consideration with a view to the best practical results.

THIRD REPORT OF THE COMMITTEE ON LUNACY OF BOARD OF PUBLIC CHARITIES OF THE STATE OF PENNSYLVANIA, SEPTEMBER 30TH, 1885.

This volume of nearly 300 pages contains a large amount of practical information on the subjects of its purview—chiefly almshouse hospitals for the care of the insane poor. Some of the State hospitals, however, appear to have been privileged to receive patients able to pay for their care. Against this practice the committee justly protests, on the ground that the need of all the State accommodation for the actually dependent class and the extent of private accommodation for those who are able to pay for it, authority should be exercised against the continuance of this injustice to the wards of the

commonwealth. Discrimination is urged between those who are of "unsound mind" from certain physical defects which may require extraordinary care, though distinguishable from those who are insane under limitations of the law to be cared for at the expense of the State. More care in this regard, the committee believes, would result in promoting the just interest of both the State and its legitimate wards. More by intimation than explicit statement, the "management of the hospitals" appears to be somewhat deficient on account of too much parsimony in the quality and number of medical superintendents and assistants—remuneration should be sufficient, to command those who possess the best qualifications; and however good the school for gaining practical knowledge of nervous diseases by young graduates in medicine, the competency of those who are accepted as assistants should always be a primary consideration. Mechanical restraints in the management of the insane are unqualifiedly condemned.

Special reports on the various institutions, their capacity, protection against fire, sanitary conditions and surroundings, are given in detail, followed by hospital statistics, dietaries, etc., and a description of almshouses, with their appurtenances and the number of insane poor cared for in these institutions.

TRANSACTIONS OF THE STATE MEDICAL SOCIETY OF WISCONSIN, 1885, a pamphlet of 170 pages, comprehending twelve papers on subjects in practical medicine and surgery, all good in their way; and "Fraternally Yours," the address of the President, Edwin W. Bartlett, M.D., an excellent essay on the humanities of the profession, in its ethical aspects; but there is nothing on preventive medicine. This omission is the more remarkable, since Wisconsin has an active State Board of Health, well sustained by the co-operation of the medical profession throughout the State, and its efficient secretary and executive officer is also Permanent Secretary of the State Medical Society.

INSIDIOUS SEPTICÆMIA, by George J. Engelmann, M.D., Professor of Obstetrics, etc., St. Louis, is a *brochure* of seventeen pages, giving the details of a "Rare, Deceptive, and Fatal Form of the Disease," worthy of the attention of all medical

practitioners, especially of obstetricians. "A New Departure in Uterine Therapeutics—the Dry Treatment," an address before the St. Louis Obstetrical and Gynecological Society, by the same author, is also of interest to the same class of readers.

COCOAINE IN HAY-FEVER is the subject of a *brochure* from the *Journal of the American Medical Association*, by Seth S. Bishop, M.D., of Chicago, wherein the manner of using and the virtues of the remedy as a palliative are described and recommended to the medical profession.

THE STUDENTS' AQUARIUM, by S. Jacob, naturalist, Newport, R. I., is a pamphlet of thirty pages, giving instructions how to make and manage aquaria, and a catalogue of interesting curiosities. Price, twenty-five cents.

FRACTURE OF THE CORACOID PROCESS, by J. W. Byers, M.D., of Charlotte, N. C., is a *brochure* of ten pages, giving an account of this rare injury, in his own practice, and citing a number of cases in the practice of others; of interest to all surgeons.

IS LAGER-BEER AN INTOXICANT?—A stone-cutter, whose office adjoined his stone-yard, was seated in his office when a friend called upon him, and they discussed several topics together, among them the question as to what extent lager-beer was an intoxicant. The stone-cutter maintained that beer was not intoxicating, while his friend maintained the opposite. The stone-cutter said, there is a man at work in the yard (pointing to a brawny-chested German) who could drink a bucket (three gallons) of beer at one sitting and feel none the worse for it. The friend doubted, and a wager was made and the workman called, who when asked if he could drink that bucket (pointing to a large water-bucket) full of beer at one sitting, replied, "Vell, I don'd know; I lets you know after a vile." The German went away, and after remaining about fifteen minutes, returned, and said, "Yes, I can trink dot peer." The bucket of beer was procured and placed before the German, who very soon absorbed the last drop, and arose from his seat, wiping his mouth with his sleeve, and was walking away with a firm step, when his employer recalled him and said to him, "See here, my friend

and I have some curiosity to know why you did not drink the beer when you were first asked." The German replied, "Vell, I don'd know dot I could trink it, so I vent out und trink a bucked, den I know I could do it."—*W., in Harper's Magazine.*

THE ST. LOUIS MEDICAL AND SURGICAL JOURNAL is to be congratulated on having, with the June number, concluded its fiftieth volume. The new auspices under which it is now conducted, the character of its contributions, the choiceness of its excerpta, the vigor of its editorial department, and its general make-up are well calculated to commend it to the general favor which it merits, and to promote its enduring qualities.

PROGRESS is the title of a new forty-eight-page octavo medical monthly, edited by Dudley S. Reynolds, A.M., M.D., Louisville, Ky. Dr. Reynolds needs no new introduction to the profession; he is well known as the whilom editor of the *Medical Herald.* His new venture appears to be less to fill a "great want" in medical journalism than to continue to command "the cordial support of nearly every one of those distinguished gentlemen" who always made the *Medical Herald,* under his management, a welcome visitor. $2.00 a year.

MISCELLANY.

YALE COLLEGE OBSERVATORY.—The Report of the Board of Managers for the year 1884–85 contains much useful information with regard to the necessity of thoroughly accurate time-pieces and thermometers in the registration of horological and thermometrical observations. The number of time-pieces received for correction during the year was 58; thermometers, 5696—of which 5580 were clinical thermometers. The method of comparing and correcting time-pieces is explained; as also the liability of thermometers to get out of order and how they are corrected. Correspondents should address Robert Brown, Jr., Secretary of the Observatory.

SUBSTITUTION.—All city physicians, where prescriptions are put up by apothecaries, are more or less liable to the substitution of other remedies for those they prescribe, as all apothecaries are more or less liable to be occasionally short of

full stock, and, under such circumstances, some apothecaries are prone to substitute something else which *they* think just as good sooner than ask for time at the risk of losing a customer. Messrs. Battle & Co. furnish the following illustration :

VAN BUREN, O., September 10, 1886.

Messrs. Battle & Co., St. Louis, Mo.

GENTLEMEN : In the case of "insomnia" which I reported to you in May last, and wherein it required seven drachm doses (hourly, 1 drachm) to produce sleep by bromidia bought at pharmacy in Findlay—it required but one drachm, repeated in *one* hour, to produce a good night's rest, of the sample bottle you sent me. I also use the bromidia (Battle & Co.) with the best results in "cholera infantum" and in "hysteria."

Am satisfied that the article bought at Findlay was "spurious." GEORGE SPRINGER, M.D.

HYDROLEINE.—The attention of *physicians* is invited to the fact that the *keeping qualities* of hydroleine have been so improved that it will not change in any climate. Every bottle guaranteed to keep fresh and all right in any temperature.

LACTOPEPTINE.—Dr. Livezey writes : "While wintering in Florida I met with my annual patient, a young lady of twenty-eight, from Chicago, who was sent hither three or four years ago in order to pass out into the 'spirit land' comfortably, who now, being troubled with poor appetite, a slight but distressing nausea, great debility, irregular menstruation, excessive cardiac action on the least exertion, etc., I ordered one ounce bottle of lactopeptine of the New York Pharmacal Association's manufacture, and she improved at once. Soon after she met a lady friend, who told her she ought to take lactopeptine, stating what wonders it had done her, who was troubled 'just the same way' (of course). 'Why, bless me,' said my patient, 'that is just what my doctor prescribed for me, and I am doing nicely.' By the time she finished the small vial she declared she never felt better in her life, her appetite being regular and everything O. K.

"N. B.—She has taken since lactopeptine, elixir calisaya, iron, and bismuth, with excellent results."—*The Medical Summary.*

THE SANITARIAN.

NOVEMBER, 1886.

NUMBER 204.

WATER ANALYSIS.

SOME POINTS OF INTEREST CONNECTED WITH THE WANKLYN METHOD OF SANITARY WATER ANALYSIS, PARTICULARLY ON THE DETECTION OF RECENT SEWAGE, AND THE DETERMINATION OF THE NATURE OF THE ORGANIC MATTER.

By CHARLES SMART, Major and Surgeon U. S. Army.

NOT a great many years ago sanitary chemists affected a more precise knowledge of the organic matter in a water than those of the present day attempt to claim. Results were announced in grains per gallon ; and the outside world conceived that the whole matter was understood. More recently the establishment of arbitrary scales of purity or impurity, based on the results of special processes, has taken the place of the former method of giving a verdict, and the outside world, when not trammelled by personal considerations, has acquiesced in this assumption of special knowledge. Occasionally, as a consequence of this, an analyst at the present time falls in the esteem of certain individuals when he acknowledges his inability to give full information concerning the organic matter in a water, to state positively whether a water is wholesome or unwholesome, or to detect a trace of sewage which is known, or strongly suspected, to be present. Even men well versed in the general principles of sanitary science have, by these acknowledgments, been led to regard the labor-

atory work of the analyst as a kind of quasi-scientific hocus-pocus, which tells as little as the ancient oracle. The fact is, that although the principles involved in these processes are incapable of indicating whether a specific morbific agency is present, they very frequently throw much light on the probable character of a water. Microscopical and biological inquiry will perhaps ultimately supersede the purely chemical methods; but the former are in their infancy as yet, and although very promising as children, it remains to be seen whether they will fulfil their promise. Meanwhile the work of the world in this line has to be performed by the chemical processes, and it is encouraging to know that the more these are studied the more definite becomes the testimony they are capable of yielding.

I propose here to refer in particular to certain results of the Wanklyn process that are not generally appreciated. This process measures the free ammonia in a water and afterward the albuminoid ammonia, or that formed by the breaking up of the nitrogenous organic matters. The former, when in relatively large quantity, and particularly in well waters, is usually due to cesspool, sewer, or privy connections. The latter is a measure of the existing impurity, and, if relatively large, is naturally suggestive of unwholesomeness. Wanklyn's arbitrary limits of wholesomeness are well known and need not be repeated.

It is generally understood or assumed that the results given by the same water are always identical. On the contrary, they may be modified by the manner in which the process is conducted.

IMPERFECT CONDENSATION

of the evolved ammonia causes a loss which may vary from 1 to 12 per cent of the total, according to the slowness or rapidity of the distillation and the temperature of the current in the condenser. Slow distillation and a condensing current at winter temperatures give the minimum of loss; rapid distillation and a condensing current at summer temperatures, the maximum. This affects the total of both the free and the albuminoid ammonias; but the latter is affected even to a greater extent by the time occupied in the distillation, or by the

IMPERFECT CONCLUSION OF THE EXPERIMENT.

Wanklyn has acknowledged that his process is imperfect and that the whole of the nitrogen of the organic matter is not converted into ammonia; but he claims that, as the albuminoids in a water are of similar constitution, and yield up a definite percentage of their nitrogen, the results of the process in different instances are susceptible of comparison, and enable the operator to rate the water on an arbitrary scale. This claim is not wholly sustained by the results of recent investigations. The albuminoid ammonia does not pre-exist in the water; it is formed during the analytical operation, and requires time for its formation. The element of time is an important one. The nitrogen of some organic matters is slowly converted by boiling with the alkaline permanganate—so slowly that the experiment may reach its conclusion, by the disappearance of the water from the retort, before the whole of the nitrogen has been liberated as ammonia. This occurs with most of the alkaloidal substances. If an organic matter require boiling for two hours with alkaline permanganate to reduce and liberate its nitrogen a rapid progress of the experiment concluding the distillation in one hour will yield only a percentage of the nitrogen. A weak flame will give higher issues of albuminoid ammonia from the same organic matter than a strong flame, because it prolongs the action on the one hand and lessens the loss from imperfect condensation on the other. In all instances in which the organic matter is slowly decomposed, the yield of albuminoid ammonia will vary with the time occupied by the distillation. Some waters will give very different results, according as the process is conducted at a rate of ten or of twenty minutes for each measure of 50 cubic centimetres distilled. It is needful to bear these irregularities and imperfections in mind, for some of them give important indications as to the source and quality of the organic matter.

DETECTION OF RECENT SEWAGE.

This may be effected by noting the peculiar behavior of urea when submitted to the Wanklyn process. A few nitrogenous substances are not decomposed by the action of the

alkaline permanganate solution; among these Professor Wanklyn includes urea. He is very positive on this point. He says: "Except in the instance of nitro-compounds, urea and ferrocyanide of potassium, we have not met with any unequivocal instance of failure of an organic nitrogenous compound to evolve ammonia in being heated to 100° C, with a strongly alkaline solution of permanganate." And again: "In presence of permanganate and excess of potash, urea is doubtless decomposed; but it yields no ammonia, which is a very extraordinary and noteworthy fact." And further: "On inquiring into the other peculiarities of structure which prevent alkaline permanganate evolving nitrogen of a given organic compound in the form of ammonia, our attention is arrested by the example of urea, which evolves none of its nitrogen as ammonia when so treated."

Nevertheless, urea yields about 22 per cent of its nitrogen as ammonia when treated as Wanklyn treated the alkaloids and other organic substances in determining the amount of their nitrogen evolved as ammonia by permanganate; and if the conditions of the experiment be arranged to permit of a longer continuance of the action of the permanganate on the urea, the whole of its nitrogen will be accounted for, provided that due allowance be made for loss from imperfect condensation.

Urea in solution is resolved gradually into ammonia. This is hastened by boiling, and hastened yet more by boiling with alkaline permanganate. If a solution containing 1 mgrm. of urea in 500 c. c. of ammonia-free water be distilled, the first measure of 50 c. c. which comes over will contain a comparatively large quantity of ammonia, because during the time occupied by the liquid in reaching the point of ebullition a certain portion of the urea has been decomposed. The second measure will contain less, and the third, fourth, and subsequent measures will each contain .01 mgrm. of ammonia, showing that boiling for the time ordinarily occupied in the distillation of 50 c. c. liberates the nitrogen necessary to form that amount of ammonia. Again, if a solution containing 1 mgrm. of urea and a charge of alkaline permanganate in 500 c. c. of ammonia-free water be distilled, the first measure of 50 c. c. which comes over will contain a relatively large quan-

tity of ammonia. The second will contain less, and the third fourth, and succeeding measures will each contain .02 mgrm. of ammonia, showing that the presence of the alkaline permanganate has as strong an influence in effecting the decomposition of urea as is exercised by the boiling temperature. After all pre-formed ammonia has been liberated from an ureal solution an equable and persisting evolution takes place which may be represented by N in the absence of caustic alkali and permanganate, and by twice N in the presence of these reagents.

Dilutions of fresh or decomposing urine in tap water give similar results. When these are treated as water samples by the Wanklyn process there is first a liberation of the preformed ammonia. and afterward an equable decomposition of the urea by the continued boiling. Then, on the addition of the alkaline permanganate, there is a comparatively free liberation of ammonia from the urea and other nitrogenous substances that may be present and afterward a persisting and equable evolution, each measure of 50 c. c. containing as much again as the corresponding measure distilled in the absence of the permanganate. This peculiarity in the behavior of urea is of importance, as by it the presence of this substance may be recognized in a water. It does not appear that any other substance gives issue to the free and the albuminoid ammonias in the manner stated. Many organic chemicals have been examined and also many organic substances, including the waste products of manufactures, etc., but not one was found to present reactions by which it could be confounded with urea. Many gave a persisting and equable evolution of albuminoid ammonia, but few of these gave at the same time a persisting evolution of free ammonia ; and where in some exceptional instances of factory drainings there was a persisting evolution of both free and albuminoid ammonia, these ammonias were not yielded in the proportion of 1 : 2.

Moreover, the observations on the decomposition of urea have an approximatively quantitative value ; for since 1 mgrm. of urea in 500 c. c. of water gives a persisting and equable evolution of .01 mgrm. of ammonia when distilled alone or with sodium carbonate, as in the first half of the Wanklyn process, and an evolution of .02 in each measure when subse-

quently treated with the alkaline permanganate, a water sample which yields such results must have contained urine equivalent to, at least, 1 mgrm. of urea. Thus, a water which yielded in successive distillates of 50 c. c., each .47, .25, .15, and .15 mgrm. of free ammonia, and afterward .54, .34, .32, and .32 mgrm. of albuminoid ammonia, respectively in each of four measures distilled from alkaline permanganate, might be set down as having contained urine equivalent to, at least, 15 mgrms. of urea in the 500 c. c. of water used in the experiment. The urea in urine is, of course, a variable quantity, but as the mean of a number of experiments on fresh urine, it was found that one half of a cubic centimetre in 500 c. c. of distilled water, or 1 part in 1000, yielded the returns given above as indicating the presence of 15 mgrm. of urea in the 500 c. c. treated by the Wanklyn operation. From these data the quantity of urine present in a given sample of polluted water may be approximately estimated.

The writer was so impressed with the importance and reliability of these observations on the persisting evolution of free and albuminoid ammonia from urea that on one occasion when an unknown water, sent to him for examination, yielded such results, he did not hesitate to report the water as polluted by so much urine per gallon. His purpose was to make this a test case; and he succeeded, although he was not informed of the fact until nearly two months afterward, when, having reported another unknown water as a rain-water, shed from a clean roof and stored in a sound and clean cistern, he was made acquainted with the following particulars:

Typhoid-fever appeared in a cottage built by a gentleman as a summer residence. The quality of the water was suspected, and a sample analyzed by Professor E. S. Wood was pronounced unfit for use. A second chemist having confirmed this verdict, a physician inspected the premises and suggested that sewer gases from the ventilating pipe of the water-closets might have been condensed on the roof and washed thence into the cistern. Measures were taken to remedy this assumed evil, and the cistern was pumped out, cleaned, and re-lined with cement. The water sample which was condemned as containing so much urine per gallon was taken from this cistern after it had thus been subjected to careful and scientific

treatment. Naturally, the proprietor was shocked, and, in view of his efforts to procure a fair rain-water, felt disposed to question the analytical results rather than the quality of the water. Fortunately, however, Mr. E. W. Bowditch, of Boston, who was conducting the sanitary survey of the premises, conceived that further investigation was imperatively required. Ultimately in his examination he discovered that there were three apertures in the cistern, although only two conductors from the roof entered it. On inquiry it was remembered that a few years before, in making some additions to the cottage, a conductor had been disused, but what had been done with it was not known. The track of this old conductor was then uncovered at its cistern end, and followed to its termination in an open mouth a foot below the surface near the porch of the building. A luxuriant growth of vines rose from the surface at this point, and these vines were from time to time nourished with chamber slops. It was, moreover, found to be the custom of the house to collect all such slops in pails which were emptied through a water-closet on the first floor and then set out on the roof of the piazza to air. The old conductor was removed and its cistern aperture sealed, and the connection was cut between the cistern and the roof of the piazza. When the water again accumulated after these changes had been effected, the sample submitted for analysis was reported as a satisfactory rain-water. This appears to illustrate the value attaching to the manner in which the ammonias come over during the distillations of the Wanklyn process, and it is specially mentioned here on account of the difficulty encountered in verifying the accuracy of the chemical results. Many other illustrations might be given, but they are unnecessary.

ANIMAL OR VEGETABLE MATTER.

Wanklyn has observed that when a water containing vegetable matter is distilled with the alkaline permanganate solution the albuminoid ammonia comes over very slowly. In verifying the accuracy of this statement, it was found that the rapidity of the evolution was determined by the instability of the matter, or its tendency to a state of putrescence rather than by its derivation. Pure animal and pure vegetable albuminoids gave up their nitrogen as ammonia at an equal pace

when equal times were occupied in the distillation of the various measures. Thus, if the first measure of the distillate contained .24 mgrm., the second would contain .12, the third .06, the fourth .03, etc. But if these matters were in a decomposing condition, the second, third, and subsequent measures would each contain only one third of the ammonia found in the measure that immediately preceded it. Animal matters, however, more readily pass into the putrefactive condition, so that when the organic matter of a water gives up its nitrogen after the manner first stated, there is a strong probability of its derivation from the vegetable kingdom ; and this probability is rendered almost a certainty if a comparatively large quantity of oxygen is required for its oxidation when treated by the Kubel or Tidy method.

But vegetable matter in a state of fermentative change reveals itself during the Wanklyn process in two ways, neither of which appears to have been appreciated by any of the many analysts who make use of this method of sanitary analysis. The color produced by the Nessler reagent in a weak ammoniacal solution varies from a pale straw color to a dark-sherry brown ; but occasionally in testing the distillates of the Wanklyn process, particularly those containing the free ammonia, a green coloration masks the brown of the ammonia and prevents the accurate estimation of the volatile alkali. If there be but a trace of ammonia present, the color may be an olive-green, or even a citron-green, with generally a tendency to the development of a haziness in the liquid. No explanation of this color interference has been furnished, although some years ago a reference was made to it at a meeting of the English Society of Public Analysts. Wanklyn does not even mention its occurrence.

The frequency with which this color interference was encountered in certain experiments on water washings of air drawn over fermenting vegetable refuse led me to conceive that it was due to an ethylic compound formed during the fermentation. A reference to my laboratory note-books speedily showed that the green color was always associated with waters known to contain decomposing vegetable matter. In one instance the bilge-water of a sugar ship from Cardenas, Cuba, had given such an evolution of this coloring agent that Wanklyn's process was wholly inapplicable as an analytical method

on account of the impossibility of effecting color comparisons. Experiments with ethylic ether and alcohol, with cane sugar, starch, glucose, tannin, and fermenting vegetable matter always developed the greenish coloration and haziness. Moreover, it was noticed that watery dilutions of these substances invariably struck a deep yellow color with sodium carbonate; and another reference to former laboratory work disclosed the fact that in all cases characterized by the green coloration of the Nesslerized distillate, the water had developed a yellow color on the addition of sodium carbonate for the liberation of the free ammonia. The yellow color thus assumed and the green coloration subsequently interfering with the Nessler reaction were therefore regarded as indicating the presence of non-nitrogenous vegetable substances in the progress of fermentative change. Hence, to summarize:

A water yielding up the nitrogen of its organic constituents slowly as albuminoid ammonia contains *recent organic matter;*

Of *animal* derivation, if a small quantity of oxygen be required to oxidize it by the Kubel or Tidy process;

Of *vegetable* derivation, if a large quantity of oxygen be required:

A water yielding up the nitrogen of its organic constituents more rapidly contains *decomposing organic matter;*

Of *animal* derivation, if a small quantity of oxygen be required to oxidize it, and if there be no interference with the development of the true ammonia coloration during Nesslerization;

Of *vegetable* derivation, if a large quantity of oxygen be required, and if a yellow coloration be developed in the water on the addition of sodium carbonate and a greenish color interfere with the estimation, particularly of the free ammonia, by Nessler's method.—From *Public Health in Minnesota.*

NUTMEGS POISONOUS.—The common nutmegs are poisonous in large doses. In a case which came under medical treatment, a lady had eaten a whole nutmeg and a half, which caused extreme drowsiness, then great nervous excitement, followed by subsequent depression and pain in the region of the heart. This case points to the presence of an active principle which should be investigated.

THE INFLUENCE OF GROUND-WATER ON HEALTH.

Abstract of an Address by BALDWIN LATHAM, M. Inst., C. E., President of the Engineering and Architectural Section of the Sanitary Congress, held at York, England, September 23d, 1886.

IN presiding over this section, which is devoted to engineering and architectural subjects, it is necessary that I should say that I have been requested to address you upon a subject which properly belongs to the Climatological Section —namely, upon the probable influence of ground-water upon health. This request has, no doubt, been made in consequence of some observations which have been made in this city by Mr. North, the medical officer of health, who has traced some connection between an outbreak of typhoid fever which occurred here in 1884, and the movements of the subsoil water at that time.

Having devoted much time during the past eleven years specially to the study of the question of underground-water, and having established and maintained a number of stations for observing the relative height of subsoil water in various parts of the country, and having also collected the past records which are available in this country and elsewhere, I am in possession of facts not easily obtainable, and am able, therefore, to draw some definite conclusions as to the probable influence of ground-water upon health. Having regard to what may be called historical records, great periods of drought clearly indicate a low state of the ground-water. In looking through ancient records there are some remarkable references to the influence of drought in producing disease. The influence of light in destroying noxious properties arising from decomposing matter is also clearly indicated, and it is pointed out that the effect of keeping back the waters of the sky, and not suffering them to be poured down on the earth, would be that the noxious animals which live in the water will pollute it.

No inquiry into the question of the influence of climate on disease would be complete without reference to the labors of Hippocrates. It is curious to note in his works, written upward of 2000 years ago, that there are conditions recorded, attending healthy and unhealthy seasons, which are identical with the conditions which may be observed in this country at the present day. Hippocrates taught that all disease may be traced to natural causes, and he counted it impiety to maintain that any one more than another is an infliction of the Divinity. He pointed out to his followers that if they wished to study medicine properly, in the first place they must study the seasons of the year, and the effects which they produce. He also stated that acute diseases occur in periods of drought, and that you could tell what epidemic diseases would attack a city either in summer or winter, and what sickness each individual would be in danger of experiencing. He went much further than our knowledge at the present time enables us to go; for he stated that the changes of the seasons may be predicted from the rising and setting of the stars, so that we should know beforehand what sort of a year is going to ensue. Hippocrates also pointed out the conditions affecting a healthy period. Rains in autumn, a mild winter, neither very tepid nor unseasonably cold, and rain in spring and summer, the year is likely to prove healthy; but if the winter is dry and the spring showery, the summer will necessarily be of a fertile character. If, at the rising of the dog-star, rains and wintry storms supervene, there is reason to hope that disease will cease, and the autumn will be healthy.

It is curious that a dry winter is often the precursor of disease, not at that time, but in the following autumn. As a rule, a short supply of rain in December has a most marked influence upon the stores of underground water, and a deficiency of rain in this month has probably a greater effect in influencing the future health of any particular district than it has in any other month of the year. As a type of a healthy season the present year is an example, and fully complies with the conditions laid down by Hippocrates.

It may be interesting to note that some years ago Dr. Laycock published an interesting account showing the incidents of disease in York, from which it appeared that this city

was always susceptible to violent outbreaks of disease, traceable to local sanitary circumstances combined with peculiar climatological conditions, and that there appeared the same incidence in the prevalence of the sweating sickness of 1550–51, the plague of 1604, and the cholera of 1832, to which might be added the typhoid-fever of 1884.

The results of my prolonged investigations on the subject of ground-water in this country and elsewhere, clearly show that there is generally a direct parallelism between the conditions of health and the volume of ground-water. The years in which there has been a large quantity of ground-water present have invariably been the healthiest years, while those in which there has been a small quantity have invariably been the most unhealthy periods.

As a rule, the lowness of the ground-water indicates the future health and not the state of health at the particular time of lowness; that is, the unhealthy period, as a rule, follows the period of low water, the degree of lowness indicating the intensity of future disease, especially fever. In some cases an unhealthy period runs concurrently with the period of low water, but in all these cases there is clear evidence that percolation has recommenced before the unhealthy period takes place. These results are entirely confirmed by observations which were carried on in Paris between the years 1868 and 1883, and which have been collated and published by M. Durand-Claye, chief engineer of the municipality of Paris, with the object of putting all the facts and circumstances in connection with the outbreaks of fever in Paris at the disposal of those who might choose to investigate the subject—a course strongly contrasting with the conduct of some authorities in this country, who desire rather to hide the true facts from public view.

The observations which have been published by Professor Pettenkofer, and which were commenced in 1854, differ from the experience gained in this country, as he has shown that typhoid-fever in Munich commenced with the fall of the subsoil water, and reached its greatest intensity with the greatest degree of lowness, and with the rise of the water there was a diminution of fever, a result exactly contrary to experience in this country. Professor Pettenkofer's observations, however,

agree with the observations made here, in the fact that the greatest intensity of typhoid-fever coincides with the periods of the greatest degree of low ground-water; that is, those years in which the subsoil water has fallen to its lowest level are those in which there has been the most fever.

With regard, also, to the experience in this country as to subsoil water, it may be pointed out that there is clear evidence that the lowering of the subsoil water by artificial means will produce, and does produce, a tendency to the development and dissemination of typhoid-fever. The effect of drainage works during their construction in lowering the subsoil water where precautions have not been taken to speedily and permanently get the water back to its proper level has been, in many instances, the cause of outbreaks of typhoid-fever, but which, at the time, have been attributed to the construction of the sewer works and to sewer-gas, even in cases where no connections had, at the time of the outbreak, been made with the sewers.

It may also be pointed out that at the time of the outbreak of cholera in East London, in 1866, as to the cause of which there has been so much dispute, the very district which was most afflicted with cholera had, at the time, its subsoil water unduly lowered by the construction of the main drainage works in that part of the metropolis, and on the completion of this work and the sewers being brought into operation the epidemic terminated. . . .

It is curious that in recent times, as a rule, there has been, every ten years, a marked period of low water; for example, in 1834–35, 1844–45, 1854–55, 1864–65, 1874–75, 1884–85. The lowest water in these series probably occurred in 1864–65. In 1844–45 the low water was not intense, but it was low compared with the period. In addition to these periods there are other times of low water, and in investigating the subject it should be studied locally and comparison made with local vital statistics, for the largely-varying distribution of rain tends to equalize results when spread over large areas, as it is rarely that the sane conditions occur over extended areas at the same time.

I have been carrying on, as many of you know, very extensive observations at Croydon, and from the results there

obtained have extended them into various geological formations in different parts of the country.

The register of Croydon goes back to the year 1539, and, with the exception of years in which there has been revolution or disturbing causes of a kindred character, the record is complete. A tabulation of the whole of the burials and baptisms, extending from this early period to a date overlapping that when registration of births and deaths commenced, clearly indicates that years of drought are, without exception, the most unhealthy periods. In 1539, the first year of registration at Croydon, there is a record that in this particular year the springs were remarkably low, so low that the River Lea was nearly dried up, and writers of that age remark on the great drought and heat of that period. In that year the number of burials recorded in Croydon was 50, and the number of baptisms 55, indicating a probable death rate of 25.6 per 1000. In the following year, on the rise of the water, the burials rose to 87 and the baptisms 72, indicating that the death rate was nearly 32 per 1000. Coming to the period when we have rain-fall records, the year 1741 was a very dry time, the rain-fall at Lyndon for the year being 15.7 inches, and in that year the burials at Croydon were 271, and the baptisms 113, giving a probable death rate of 63.7 per 1000, while in the two years preceding this year the death rate was 27.7 and 40.7 per 1000, and in the following year 24.2 per 1000. Coming to more recent periods, when we have the certain records collected by the register-general, registration having commenced in the dry year of 1837, the death rate at Croydon was 30 in the 1000, and in the following year a similar rate occurred. In the years of very low water, 1854 and 1855, we had death rates of 26.84 and 21.14 respectively, while in 1851 the death rate was only 18.72 per 1000. In the dry periods, 1864 and 1865, we had death rates of 21.5 and 22.7 per 1000, while in 1860, a wet year, and one of high springs, the death rate was only 17.27 per 1000. The year 1871 was another dry period, but the low water at Croydon was not so pronounced in this year as in most other years. The death rate was not so high —viz., 18.89 per 1000—but in 1873, when the springs were very high, the death rate fell to 16.59 per 1000. After the dry period of 1874–75 the death rate rose again to 21.10 per

1000. From 1876 up to the beginning of 1884, there has been unprecedented high water, and during the whole of this period the country generally has enjoyed a high state of public health. The conditions, however, which have brought about this high degree of health have been disastrous to the interests of the agriculturist, as the large quantity of water passing into the ground has washed away the fertilizing elements, but it has secured for us the estimable boon of good health by removing the conditions which are the cause of much sickness, suffering, and death. . . .

It is clear to my mind, after the most careful consideration of this subject, that ground-water itself has no influence, either for good or evil, upon health, but that the lowness or highness of the water in the ground is the index of conditions which greatly influence the health of all communities. We have periods of abundance of water and periods of low water with both healthy and unhealthy conditions. Ground-water has been shown by Professor Pettenkofer to be chemically more impure in periods of high water when the conditions were favorable to health than when there is a low state of the ground-water and a condition unfavorable to health. The records also show that we have periods when rain has started into existence malignant diseases, while, on the other hand, we have similar heavy rainfalls accompanied by a high state of public health, as in the present year.

The records clearly point out that it is not one circumstance alone which produces disease, but that there are at least three factors necessary for the production and distribution of disease, especially typhoid-fever—viz.: 1. The elements which produce disease, such as a polluted state of the ground. 2. The conditions which are necessary for the development of disease, such as a period of dryness of the ground in those regions which water usually occupies, combined with a comparatively high degree of temperature. 3. Conditions which will lead to the spread of the disease, such as the probable influence of a storm or rain in driving impurities out of the ground into our water supplies, or through the instrumentality of ground-air passing into our habitations, and its reception by a population which is in a condition to receive such germs of disease. If any one of these conditions is absent, diseases like typhoid do not occur.

The long period of washing and purification which the ground has passed through since 1876, has generally so purified it from the producing elements of typhoid-fever, that with the exception of occasional cases of impurity, where the ground has become fouled from the leakage of sewage from the imperfect sewers into the ground, as in the case of this city, Beverly, Kidderminster, and some other places which had epidemics in the low-water period of 1884, the country has enjoyed immunity from diseases of this class. On the other hand, if we take a period when there has been marked low water for a number of years, followed by unusually low water at particular periods, these are the times when typhoid-fever is most rife, as, for example, between 1854 and 1865, with the exception of the years 1860 and 1861, when we had a high state of ground-water. The intensity of the fever rates of 1865 and 1866 point out a lesson which ought to be learned by every sanitarian—that we must keep the ground free from impurity, if we are to secure conditions which are essential for the promotion of health.

When we come to deal with local conditions preceding disease, we find that not only cholera and typhoid-fever, as pointed out by Professor Pettenkofer, are amenable to the conditions indicated by the highness or lowness of the ground-water, but probably all other zymotic diseases are influenced by the conditions which produce low ground-water, with the exception of diarrhœa. . . .

We must not, however, lose sight of other conditions which are at work, such as :

(1) *The influence of light.* It will be observed with reference to the period of percolation that it is almost parallel with the time the sun is below the horizon. The influence of solar light is well known in malarious countries, which may be traversed with impunity while the sun is above the horizon, but they become dangerous after nightfall. (2) *The influence of temperature.* There is no doubt that, in winter time, many diseases are aggravated by the intensity of cold, but cold is not essential to the promotion of disease, especially in children under five years of age. This was shown by the late Dr. Farr, and in the volume recently published by the Sanitary Institute it is pointed out that the death rate of children in Norway is

lower than that of England, while the death rate of children in England is lower than in Italy, indicating that at this period of existence cold is not detrimental to life. When we come to isolate the deaths in particular months, and compare them with the periods of low water, it often happens that extreme low water in winter corresponds with periods of great cold, and low water in summer also corresponds with periods of great heat, and it is only at such times when we are able to discount these influences by comparing them with periods when we have a normal state of things with reference to temperature, and abnormal in regard to ground-water, that the influences measured by the ground-water are brought into prominent relief. . . .

A very marked circumstance in connection with ground-water and the period of percolation is shown in the case of deaths of children under five years of age. While there may have been mistakes with reference to the causes from which a child dies, very little error occurs with regard to its age. I am of opinion that the proper way of estimating the sanitary state of any period in any district, is by taking the number of children under five years of age and calculating the deaths by the number living at these ages. The figures show, especially after deducting the deaths from diarrhœa, which are influenced by high temperature, that there is an almost exact parallelism between the period of percolation and that of deaths occurring at those ages, the smallest number of children dying in the month of June, and the largest number in December and January. Moreover, the death rate from year to year fluctuates in a very marked manner with the fluctuations of the ground-water. The most healthy periods are those in which there is the most ground-water, and the least healthy are those in which there is the least ground-water in any year. These results corroborate the strong relation which exists between the highness or lowness of water in the ground in regard to zymotic diseases. It also shows that there are influences at work which can be measured by the quantity of water in the ground, which are destructive to young life, and which may be guarded against, as these influences indicate themselves many months before they begin to affect the population; therefore "to be forewarned is to be forearmed."

The fluctuation of the water line is an essential condition in the development of disease, especially typhoid-fever and cholera. It has been pointed out by Professor Pettenkofer that in those districts in which the rivers are held up at uniform levels by weirs, the conditions are favorable to health, and in such districts cholera rarely becomes epidemic. In a great measure this is corroborated in this country by the state of health at our seaside resorts, which being the natural outflow for ground-water, and owing to the uniform height of mean tide level, are without exception placed in a condition favorable to health. We have also the record in connection with the city of York, in which it is clearly shown by Dr. Laycock, in his report on York, published in the first volume of the Health of Towns Commission, that previously to the construction of the lock at Naborn, below the city, the tide used to flow up above York, and there were considerable variations in the level of the waters from time to time; but after the construction of the lock in question the health of York materially improved. The health of districts such as the Wandle Valley is proverbial. In the latter district there are a large number of mills in a comparatively short length, holding up the water to a uniform level.

With such examples for our guidance it is clear that sewers may be of great advantage in maintaining uniformity in the water level. On the other hand, leaky sewers are liable not only to pollute the ground, but to cause considerably greater variation in the levels of underground-water than would otherwise occur in various parts of the district. Good land drainage has a tendency to produce uniformity of water level, but this should rarely be attempted to be secured through the instrumentality of sewers carrying polluted matters. The influences which are observed clearly point out how important it is to guard districts against pollution of the earth. How little regard, however, has been paid to this point, for it is only within the last ten years that the importance of making sewers as water-tight as possible has received serious consideration, and still, in many parts of the country, sewers are being constructed without any regard to water-tightness and their other influences on ground-water. Moreover, a large number of burial-grounds have been established,

in quite recent periods, in positions with respect to underground-water which more or less exercise a baneful influence on the health of the localities in which they are situated. Cesspools, ash-pits, and middensteads are still permitted to poison the air, ground, and water. No wonder that the towns which possess the means of most readily polluting the ground have, without exception, the highest rates of mortality. There can be no compromise in sanitary matters. What should be the aim of all sanitarians is the preservation of the ground from all impurities, especially in districts where the soil is of a porous character, and, above all, no supplies of water for dietetic purposes should be permitted to be taken from wells sunk in the immediate subsoil in populous places, and to secure the full measure of health, our houses should be so constructed as to prevent the admission of ground-air into them.

THE INCREASE OF THE DURATION AND ECONOMICAL VALUE OF LIFE BY PRACTICAL SANITATION.—Sir. T. Spencer Wells, Bart., F.R.C.S., in his Inaugural Address as President of the Ninth Congress of the Sanitary Institute of Great Britain, September 23d, 1886, stated that :

" We cannot be far wrong if we put the average duration of human life in Great Britain half a century ago at about thirty years ; now, according to the healthy life table, it is forty-nine years. The population in less than fifty years increased by some eight millions. Each individual of these millions was worth to the State, as is calculated, about one hundred and fifty pounds. Say that only two millions out of the eight millions of increased numbers were the fruit of sanitary and medical work, their economical value was at least three hundred millions of pounds, and that a clear gain. To this we must add that the productive powers of the population depend on labor, and that labor depends upon health. Let sickness come, men are disabled, their labor ceases, and the produce of labor is lost. Formerly it was calculated that a twenty-third part of the population was constantly sick, and the products of all that labor for the time necessarily withdrawn. A great deal of this sickness has been altogether prevented, and the duration of that which comes in spite of sanitation is lessened.

Happily did Richardson give form and expression to the proverb: 'National health is national wealth!' and well may Froude follow with his paraphrase: 'The *commonwealth* is the *common health*, the common wellness,' and add: 'No nation can prosper long which attaches to its wealth any other meaning.'"

ASYLUM ABUSES.—"The tendency of all asylums is to retain their children too long. We have examples of institutions that were established under the name of temporary homes, for the sole purpose of effecting a rapid transition from a condition of dependence to family life, which, in a few years, lapsed into inactivity in placing out, and eventually became permanent homes for children. Among the temptations to over-retention is a pride in numbers. After much drilling, the children become proficient in their exercises, and there is a reluctance to be continually breaking up the band that makes the asylum inmates, as a whole, appear attractive; and there are all the while growing personal attachments between the children and those connected with the asylum, which it is hard to sunder. Thus it sometimes happens that, when the best family homes are open and waiting, the managers resist the attempts to place out their wards. Again, when the payment by municipalities or counties for the child's maintenance is sufficient to meet the entire cost of support, or, as is sometimes the case, afford a small profit, there is a pecuniary inducement to retain children.

The result of retaining children so long within the institution is, that the asylums in some of the municipalities have greatly expanded, and their numbers increased to an extent that has caused complaint from tax-payers, as also from the benevolent who contribute to their support. Another serious consequence is that of over-crowding, which, in some of the larger institutions, has resulted in the prevalence of ophthalmia to an alarming extent. Thus there is danger of this otherwise excellent system being crushed by its own weight."—*Address made before the Thirteenth National Conference of Charities and Correction, St. Paul, Minn., July,* 1886, *by Hon. William P. Letchworth, President of the New York State Board of Charities.*

THE TREATMENT OF SEWAGE.

Abstract of a Paper read before the Society of Arts, London, April 14th, 1886, by C. MEYMOTT TIDY, M.D.

LIQUID EXCRETA.

EVERY adult male person voids on an average 60 ozs. (=three pints) of urine daily. The 60 ozs. contains an average of 2.53 oz. of dry solid matter, consisting of—

Urea	512.4 grains.
Extractives (pigment, mucus, uric acid)	169.5 "
Salts (chiefly chlorides of sodium and potassium)	425.0 "
	1106.9 "
	=2.53 ozs.

The urine, therefore, of a population of 10,000 adults may be taken as 600,000 fluid ozs., or 3750 gallons per day.

Urine rapidly decomposes, the urea becoming the volatile body carbonate of ammonia, and the urine thereby losing a valuable manurial constituent. After a time, but at a later stage, certain foul-smelling gaseous products of decomposition are evolved. To collect and preserve urine, therefore, presents practical difficulties. The ammonia from stale urine was formerly distilled and converted into a sulphate, at Courbeville, near Paris.

Every adult male person voids about 1750 grains (or 4 ozs.) of fæces daily, of which 75 per cent is moisture. The dry fæcal matter passed daily is therefore about 1 oz. per adult head of the population. Of this *dry* fæcal matter, about 88 per cent is organic matter (of which 6 parts are nitrogen) and 12 per cent inorganic, of which 4 parts are phosphoric acid. Of this dry fæcal matter 11 per cent is soluble in water.

Taking a population of 10,000 adults, it follows that the moist fæcal matter passed daily is equal to 2500 lbs. (=1 ton, 2 cwt., 8 lbs.) or 1.116 ton, while the dry fæcal matter is equal to 625 lbs. (5 cwt., 2 qrs., 9 lbs.).

VALUE OF NIGHT SOIL (HUMAN EXCRETA).

Urine, in its natural condition, has a theoretical value of between 15*s.* and 16*s.* per ton. The dry solid matters of the urine have a theoretical value of about £18 16*s.* per ton.

The quantity of ammonia per year voided by the average individual in the urine has been stated as from 10 lbs. to 11.32 lbs., having a value on the lower quantity of 6*s.* 8*d.*, and on the higher of 7*s.* 3*d.*

Fæcal matter, in its moist and natural condition, has a theoretical value of £1 7*s.* 6*d.* per ton. The dry solid matters of fæces have a theoretical value of £5 17*s.* 7*d.* per ton.

The quantity of ammonia voided per year in the fæces, by an average individual, is estimated at 1.64 lbs., having a value of about 1*s.* 3*d.*

The estimates given above are based on the agricultural values of the nitrogen calculated as ammonia, together with the phosphoric acid and potassium salts, these being materials of sparing occurrence in land, but entering largely into the composition of every variety of agricultural produce. Lime, magnesia, and iron, equally essential to plant development, occur largely in most soils.

Respecting the value of the nitrogen, however, of sewage, Voelcker regards it as at least of 10 per cent less value than the nitrogen of ammoniacal salts ready formed.

Authorities differ between 6*s.* 6*d.* and £1 in estimating the annual value of the excreta of one adult. Thudichum gives it at £1; Hofmann and Witt at 11*s.* 9½*d.*; Voelcker at 9*s.*; Lawes and Way at 8*s.* 5¾*d.*; Anderson, of Glasgow, at 8*s.*

MIDDENS.

Sewage absorbents.—The cesspool and the midden were the first attempts at collecting excreta, not so much, however, for the purpose of profit as with the idea of preventing nuisance. The cesspool had many and great disadvantages, not the least of which were the noxious inhalations evolved, the necessity of occasional emptying, and pollution of the drinking water of the wells in the neighborhood. The ash-pit midden had, and has, its advantages and its difficulties. Of the difficulties, the education of the people to use them properly was chief, a diffi-

culty, however, that applies almost as much to water-closets as to middens. A second difficulty in the use of the middens consisted in securing proper scavengering arrangements by the local authority, a difficulty, it may be again noted, not one iota less great in securing the efficient treatment of sewage. Provided the midden be regularly attended to and properly constructed—*e.g.*, erected away from the house, the pit small, roofed in so as effectually to stop out rain or other water, floored with sloping flags to render the removal of the contents easy, impervious to surface water and not drained, dryness of contents being effected by the use of ashes well distributed over the soil—there are more objectionable ways of dealing with refuse than by the midden system. Under conditions of individual and general supervision, the compost, if sufficiently often removed, need not be a nuisance. But if the midden be neglected by the public authority and by the householder, no doubt it may become a prolific source of disease, as Manchester and Liverpool can testify.

The advantages of the pail system are not to be overlooked. Thus the pails are always placed outside the house; while a certain regular process of inspection is rendered necessary, insuring the detection of a nuisance before it becomes a source of danger. In time of epidemics, again, disinfectants may be extensively used in the pails as they are being distributed.

Another great advantage of the midden system is to be found in the diversion of excremental matters from rivers and water-courses. Much sewage at Manchester is thus kept out of the River Medlock. Strange to say, however, the Rivers Pollution Commissioners (Dr. Frankland) state that the sewage from water-closet towns is no worse than that from midden towns. The following is an abstract of the results recorded by Dr. Frankland:

AVERAGE RESULTS.

	Matters in Solution.			Matters in Suspension.	
	Total Solids.	Chlorine.	Total Nitrogen.	Total.	Organic.
Midden town sewage (37 samples from 15 towns).	57.68	8.08	4.52	27.38	14.91
Water-closet town sewage (50 samples from 17 towns).....	50.54	7.46	5.41	31.29	14.36

On this one question suggests itself—how is it that the suspended matter in the sewage of midden towns is almost identical with that from water-closet towns, seeing that Dr. Frankland states that an average of 25,561 tons of solid matter per annum is annually kept out of the sewers at the several midden towns mentioned? (See Report on Pail System at Nottingham by Dr. Seaton, Society of Arts Conference, 1875, p. 155.)

The pail system may consist either in the use of a little disinfectant or of some absorbent material.

Adopting Mr. Gilbert R. Redgrave's classification of the pan, pail, and midden systems of disposing of sewage (Society of Arts Conference, 1877, p. 33), we shall discuss the subject under the following three heads: I. Pails without absorbents. II. Pails with absorbents. III. Pails used for the joint collection of ashes and excreta.

I. PAILS WITHOUT ABSORBENTS.

Of these the Rochdale system (see Society of Arts Conference, 1877, pp. 9 and 33, Mr. Alderman Taylor and others) may be regarded as principal. In support of the non-use of any absorbent, it is urged that to keep out "the profligate associate" is a main object; concentration, not increase of bulk, being the point to be aimed at. The excreta and dry house refuse should be collected at intervals in separate tubs of special construction, the excreta tub being fitted with an air-tight lid, so that transport may be effected without causing a nuisance. The cost per pail per annum is about 5*s.* 8*d.* The ashes are carefully screened and sorted.

From the experience of many towns (Rochdale, Salford, etc.), it would appear that two men and one horse (say at a working cost of £3 per week) can remove 600 tubs or pails per week, each pail containing an average of 84 lbs. of excremental matter. This equals 22½ tons per week at a working cost of 2*s.* 9*d.* per ton. At Rochdale, 10,112 pails were in use in 1882, the weight of excreta collected being 8518 tons, and of refuse ashes 18,396 tons, from 15,289 houses, and 237 mills and workshops, with an estimated population of 65,500. In 1881, 552 tons of manure were manufactured. It is calculated that a tub is used by 9.2 persons living in 2.2 houses, the yield

being 2.07 cwts. of excreta per head per annum. At Halifax it was calculated that each tub is used by 10.9 persons living in 2.6 houses, the yield being 3.26 cwt. of excreta per head per annum. At Birmingham the returns give from 9.6 to 11.5 lbs. per week per head.

II. PAILS WITH ABSORBENTS.

In many places, the use of boxes, pails, or tubs, charged with various absorbent materials (ashes, etc.), has been adopted. Numerous substances (see paper in Society of Arts Conference, 1877, p. 49) have been suggested as absorbents. Of these Liebig recommended coarsely-powdered bog turf and Stanford charred seaweed. Stanford claims that seaweed is three times, weight for weight, as effective as dry earth (1 cwt. being sufficient for one month for a closet daily used by six persons). He claims, moreover, that it is easily reburned, and that the ammonia and fixed salts have been recovered, the charcoal remains as effective as before. Various forms of refuse, too, have been suggested as absorbents, of which may be noted, refuse wool or shoddy, dry horse-dung, spent dye-stuffs, etc. At certain towns, spent dye-wood (such as fustic), in the manner suggested by Goux—viz., ramming into a tub by a central core, so as to give a uniform lining to the tub, has been employed. Thus splashing is prevented. This method necessitates the frequent removal of the excreta (otherwise the absorbent lining would break down and a semi-liquid mass result), and it is also necessary that the receptacle should be tightly secured before removal to prevent escape of offensive effluvia during transit.

[For a full description of the Goux system, as carried out at Halifax, see remarks by Mr. Councillor Pollard, Society of Arts Conference, 1877, p. 2.] The tubs are packed with screened ashes, soot (cost, 50*s.* per ton), or peat charcoal (£3 per ton), shoddy or mill refuse (cost 2*s.* 6*d.* to 7*s.* per ton), street sweepings, to which sometimes disinfectants are added. The closets are cleared every eight days, except when there is fever in a house, when it is removed every two days. The packing of each tub will absorb from six to eight quarts of liquid. It is said to work satisfactorily. The cost is about 18*s.* 6*d.* per annum per closet, while the material fetches from

3*s.* to 7*s.* 6*d.* per ton. Dr. Syson (Peterborough) and Mr. Haviland (Northampton) speak in favor of the system, the latter contending that where it has been adopted, the death rate showed improvement. Any good absorbent that can be obtained at a cheap rate on the spot may be used—*e.g.*, tan. The material after emptying has little smell.

III. PAILS USED FOR THE JOINT COLLECTION OF ASHES AND EXCRETA.

Of this method the system adopted at Nottingham is a case in point. Here the tub takes the place of the midden pit. It is to be noted that the ashes are of less quantity in summer-time, when the chance of nuisance is greatest.

With respect to the mechanical appliances suggested for sifting the ashes, so as to apply only the smaller breeze to the excreta, practice proves them somewhat unsuccessful.

The compost is removed every two or three months and conveyed to the manure wharf, where it is emptied into barges and sold at a price that covers two thirds of the cost of scavenging.

At Birmingham, where galvanized pails are used to the extent of some 40,000 (representing a population of 250,000), the contents are collected weekly. These are emptied into a vat at the place of deposit, and some sulphuric acid added to fix the ammonia. The contents are passed into a drying-machine, consisting of a steam-jacketed cylinder, within which are revolving arms, the necessary heat being obtained by burning the cinders and garbage collected in the town. The clinkers are utilized for various purposes.

The process adopted at Manchester, devised by Mr. Leigh and carried out by Mr. Whiley, was described in detail by Mr. Alliott, of Nottingham, at the Society of Arts Conference, 1877 (p. 7, also 37). The objects are (1) the disinfection of the pail contents by the use of charcoal, produced by charring street sweepings; and (2) the reduction in bulk of the matters so collected. For the purpose of reducing bulk, the liquid in the pails is drained off, and concentrated by a low heat to the consistency of treacle (about one tenth the original bulk). The heat necessary for effecting evaporation is obtained by passing the products of the combustion of house refuse over

the surface of the liquid. (Fryer's concreter.) A certain amount of sulphurous acid is thus generated, which serves to prevent the material from becoming alkaline, while the temperature, it is said, is sufficiently kept under to prevent loss of ammonia. The liquid thus obtained contains nine to ten per cent of ammonia. (Angus Smith.) A second variety of manure is made from the fæcal part of the pail stuff, which is also evaporated down to a certain extent. A third variety is prepared from the carbonized refuse, saturated with some of the concentrated urine, mixed with fæcal matter; and a fourth variety of manure from the fish and slaughter-house refuse, mixed with ashes, urine, and fæces.

I do not propose discussing the pneumatic system of collecting excreta. In certain places on the Continent (Paris, Milan, etc.) the sewage is collected in water-tight cesspools. These are emptied by atmospheric pressure, the contents being forced into movable exhausted iron tanks, through flexible tubes lowered into the cesspool for the purpose. By this means the escape of noxious effluvia is supposed to be prevented.

The cost of removing the excreta at Paris is about £5 per house per annum. The material is converted at Villette into *poudrette*, great nuisance resulting (Society of Arts Conference, 1877, p. 14). The arrangements of Liernur (which have been adopted in Amsterdam, and to a certain extent in Prague) are, in many respects, similar. Liernur suggests cesspool tanks being placed in the middle of a street, each tank communicating with from fifteen to twenty houses.

The systems of Berlier, partly in use in Paris since 1881, and of Shone, a method of pumping sewage by small pneumatic pumping-engines, the power being generated at a central station, need only be mentioned.

As general rules we consider:

1. That the removal of the pails should be under the control of the local authority.

2. That on an average they should be renewed once a week, a clean, well-washed pail being substituted for the full one.

3. That air-tight covers should be fitted to the pails before removal, and that they should be conveyed in air-tight vans to the depot.

The utilization of the excreta collected in pails is a matter

of great difficulty.* At best a low class of manure results, unless some form of concentration be adopted.

Voelcker states that, having examined every form of night-soil manure, he never found one having a theoretical value greater than £1 per ton, unless the manure had been specially fortified with guano, or superphosphate, or sulphate of ammonia, etc. The better varieties he valued at from 15*s.* to 17*s.* 6*d.* per ton, while those less carefully prepared were not worth more than from 7*s.* 6*d.* to 12*s.* 6*d.*

THE EARTH-CLOSET.

The disinfecting power of earth has been known from remote antiquity. In China, the formation of a manure by mixing earth with the excreta is of ancient date.

In this country, Rosser, in 1837, proposed the admixture of urine and fæcal matter with earth, lime, etc. The suggestion took no practical shape until 1858, when the Rev. Henry Moule, the vicar of Fordington, investigated the disinfecting and deodorizing power of earth on privy soil. As the result, he invented his earth-closet. At his own vicarage, where the cesspool proved to be dangerously near the well, he abolished the cesspool, and placed buckets beneath the pans. Their contents were, in the first instance, mixed with dry sifted earth, earth afterward being placed in the bucket itself, and the compost left to consolidate in a shed. After five or six weeks he found that the material had entirely lost its offensive odor, and was sufficiently dry to be used again. Thus eventually he not only disinfected his sewage, but produced a manure containing one third its weight of dry excrement. The next point was the mere mechanical construction of a closet, worked by a handle, with contrivances to secure the application of a proper proportion of dry earth. The earth may, however, be thrown into the closet in one application daily, a method adopted in the latrines at Lancaster, which are under the control of the local authority.

As regards the earth best adapted for the purpose, a well-dried clayey earth—that is, a heavy soil loaded with clay—holds the first place; peaty earth comes next, although for

* For an account of Milburn's drying machinery, see Society of Arts Conference, 1877, p. 52.

efficiency a long way behind a clayey earth. The peaty earth used at the Wimbledon Camp in 1867 was not satisfactory, as it produced a wet and sour compost. Sand and clay are found to have very little deodorizing power, and are therefore ill-suited for the earth-closet. The clay soil must be well dried artificially (for in a damp condition its absorbent power is inferior), and after drying, powdered and sifted.

About 4½ lbs. of dry earth per head per day (*i.e.*, 1½ lbs. for each visit, three visits being allowed for each person), is required to obtain a consolidated and unoffensive compost. This quantity was ultimately used at the Dorset County Jail, the 3 lbs. per head of earth used in the first instance being found insufficient. A village of 1000 persons would need, therefore, about 2 tons of dry earth per day. The dry-earth system was used at the Dorset County School, at the villages of Halton and Aston Clinton near Windover, in Lancaster, and at the Wimbledon Camp. In this latter case Dr. Buchanan closely investigated the working of the process.

After the removal of the earth it may be dried and returned to the closet until its manurial value justifies its sale.

As regards composition and value of the product, much will depend on the demand, and on the method adopted in working (*i.e.*, how many times the material had been used). At Lancaster the compost fetched *7s. 6d.* to 10*s.* per cubic yard. At Dorset County Jail it reached £1 per ton, and at the Dorset County School £2 to £3 per ton. Perhaps 10*s.* per head of the population annually might be taken as an approximate value.

The dry-earth system has certain definite advantages over the water-closet. The first cost is less. It reduces the quantity of water required by each household. The closet is less liable to go wrong, to suffer injury from frost, or to be damaged by improper substances being thrown into it. No doubt an intelligent person can manage it, but if it be used in villages it should be managed by the local authority, easy access to the closets by the scavengers being, in such case, indispensable. Of course, a dry-earth system does not supersede the necessity for some independent means of removing slops, rain, and subsoil water.

A still further advantage claimed for the earth-closet is the

manurial value of the compost, and the ease with which it may be stored until required.

No doubt the earth-closet has its objections. Of these, a certain filthiness (real or imaginary), and the difficulties of supplying the necessary quantity of dry earth and of removing the compost, are those chiefly urged. No doubt the collection of material that may be more or less foul as the closet has or has not been attended to by the scavengers, and the after distribution of the compost, compare, at first thought, unfavorably with the cleanliness of water, and the ease with which it serves to convey the filth from the closet to the field. But this assumes (1) no misadventure of the water-carried sewage between closet and field; (2) a farm and a crop ready at all times and seasons—wet or dry, summer and winter—to receive and to appropriate it; and (3) no escape of noxious effluvia and miasms, no spread of disease, and no pollution of water-courses. How far such assumptions are realized I shall consider presently.

Earth-closets have been largely used, and their use is rapidly extending in India, where the drying of the earth is a comparatively easy process. The authorities in India, in 1867, reported to the Secretary of State that Moule's system, which was then generally employed in the barracks, jails, hospitals, and public institutions of the three presidencies, had been found to be a great public benefit. I can, myself, bear testimony to the excellent results of the dry-earth system where the closets are properly attended to, proper earth used, and the materials properly dried.

HOW TO RENDER BRICKWORK WATER-PROOF.—Perhaps one of the best linings is asphalt, and the Hygeian Rock composition has been used with success. A mortar that is said to be water-proof is made with lime slaked with green vitriol instead of water. The quantity of green vitriol is dissolved in warm water, the lime is then slaked in the usual manner and then mixed with fine quartz sand. For water-proofing brick walls, the following mixture has been recommended: Soft paraffine wax, two pounds; shellac, one half pound; powdered resin, one half pound; benzoline spirit, two quarts; dissolve these by gentle heat in a water bath,

then add one gallon of benzoline spirits and apply warm. The mixture is very inflammable, and must be kept away from the fire. We may mention here another method of making brickwork impervious to water, known as Sylvester's process, which was used with success on the Croton Reservoir, Central Park. It consists in the successive application to the walls of two washes—one composed of Castile soap and water and the other of alum and water. The proportions are three quarters of a pound of soap to one gallon of water, and one half pound of alum to four gallons of water. The walls should be quite dry and clean, and the temperature of air not below 50° Fahr. The soap wash is laid on first with a flat brush and at a boiling heat. After twenty-four hours the wash becomes dry and hard, and the alum wash is applied at a temperature of 60° to 70° Fahr. This is allowed to remain twenty-four hours, when the operation is repeated until the wall has become impervious to water. The number of applications required will depend on the water pressure to which the wall is subjected. In the Croton Reservoir case four coatings were found to render the reservoir free from leakage under forty feet head.

Resin has been used also as a protection against moisture. Five parts of turpentine heated and stirred in ten parts of pulverized common glue and one part of finely sifted sawdust are then applied to the wall, which should be cleansed and heated by means of a lamp, so that the composition may run into every crack and joint. Very often a cement lining is of no use to make a tank water-tight, especially where the bricks and joints are of an inferior description, and the aim should be to get a composition which, when heated, enters the pores of the brickwork and renders them impervious.—*Building News.*

NICKEL POISON.—An order has been issued in lower Austria forbidding manufacturers and tradesmen to sell *nickel-plated cooking vessels.* It is stated that vinegar and other acid substances dissolve nickel; and that this, in portions of one seventh of a grain, causes vomiting, and is even more poisonous than copper.

HEALTH OF THE U. S. ARMY FOR JUNE, 1886.

DURING the month of June, in eight military departments, embracing 144 military posts and arsenals and 27 commands operating in the field, from which reports were received, there was returned a total mean strength of 23,437 officers and enlisted men.

There were admitted to sick report 2344 cases of disease and injury, or 100 per 1000 of mean strength.*

This is a decrease of 9 per 1,000 below that for June, 1885, and 42 per 1000 below the average monthly rate for the ten years (ending December 31st, 1884), which was 142 per 1000 of strength.

Thirteen deaths occurred, as against 19 for the previous month, and 16 for the previous June. This represents an annual mortality from all causes of 6.7 per 1000, or 6.0 per 1000 less than the average for the preceding decade, which was 12.7 per 1000 of mean strength.

The number of discharges for disability was 58,† representing an annual loss to the army from this cause of 30 per 1000 of strength.

The number of troops constantly non-effective from sickness was 869, or 37 per 1000 of strength, being the same as that for last month. The rate for the previous June was 38 per 1000, and for the previous decade 44 per 1000 of strength.

The average duration of treatment among patients who recovered was 10 days, and among those who died, 44 days. The causes of deaths were returned as follows: Apoplexy, 2; enteric-fever, 1; typho-malarial-fever, 1; pulmonary phthisis, 1; pulmonary hemorrhage, 1; pulmonary œdema, 1; cardiac dilatation, 1; peritonitis, 1; hepatic cirrhosis, 1; drowning (accidental), 2; shot wounds (homicide), 1.

The causes of admission, and those which have chiefly served to impair the health of the army during the month of June, are shown in Table I.

* The names and diseases of all officers and enlisted men who are excused from any part of their military duty by reason of disability are required to be entered upon the reports from which these data are drawn.

† Recruits at depots, discharged for disability which existed prior to enlistment, not included.

TABLE I.

Causes of admission in the order of their numerical importance.	Number of cases.	Rate per 1,000 for June, 1886.	Average rate per 1,000 for ten previous Junes.	Increase or decrease of rate.
First.				
Injuries and accidents	417	17.79	17.80	— .01
Contusions and Sprains	237	10.11	11.78	— 1.67
Incised, punctured, lacerated and contused wounds	80	3.41	3.38	+ .03
Shot wounds	13	.55	.88	— .33
Fractures (not shot)	10	.43	.55	— .12
All other injuries	77	3.29	1.21	+ 2.08
Second.				
Diarrhœal diseases	335	14.29	22.15	— 7.86
Diarrhœa	295	12.59	19.05	— 6.46
Dysentery	20	.85	2.29	— 1.44
Cholera-morbus	20	.85	.81	+ .54
Third.				
Malarial-fever and resulting conditions	308	13.14	18.72	— 5.58
Fourth.				
Diseases of the digestive system.	287	12.25	?	?
Constipation, dyspepsia, and colic	146	6.23	9.88	— 3.65
Tonsillitis, pharyngitis, and sore throat	59	2.52	?	?
Other diseases of this class	82	3.50	?	?
Fifth.				
Rheumatism	157	6.70	9.21	— 2.51
Sixth.				
Diseases of the nervous system	150	6.40	10.66	— 4.26
Headache and neuralgia	125	5.33	9.44	— 4.11
Other diseases of this class	25	1.07	1.22	— .15
Seventh.				
Diseases of the respiratory system	135	5.76	9.59	— 3.83
Catarrh	64	2.73	5.78	— 3.05
Bronchitis	43	1.83	2.34	— .51
Pleuritis	10	.43	.40	+ .03
Pulmonary phthisis	5	.21	.32	— .11
Pneumonia	2	.09	.23	— .14
Other diseases of this class	11	.47	.52	— .05
Eighth.				
Venereal diseases	132	5.63	?	?
Gonorrhœa and results	69	2.94	4.10	— 1.16
Syphilis and results	36	1.54	3.86	— 2.32
Other diseases of this class	27	1.15	?	?
Ninth.				
Enteric-fever	6	.26	.19	+ .07
Tenth.				
Typho-malarial fever	1	.04	.25	— .21

The rate of recoveries to the whole number under treatment was 684 per 1000; the rate of deaths, 4 per 1000.

Among the more important diseases under treatment during the month of June, those remaining sick from the previous month being included, were 7 cases of enteric-fever, 6 new cases being reported; 10 cases of pneumonia, only 2 of which were new admissions; and 24 cases of pulmonary phthisis, 5 of which were newly admitted. This is an increase of 4 cases of enteric-fever and a decrease of 5 cases of pneumonia and 2 cases of pulmonary phthisis from the whole number under treatment in May.

The ratio of mortality from enteric-fever to cases treated was 14.3 per cent; from pneumonia, 0 per cent; and from pulmonary phthisis, 4.2 per cent.

Of contagious and infectious diseases there were 11 cases of measles, 1 of erysipelas, 1 of mumps, and 1 of whooping-cough.

A comparison of the health of the several military departments is given in Table II.

TABLE II.

	Admission rate per 1,000 of mean strength.	Number of troops per 1,000 of mean strength constantly non-effective from sickness.	Average number of days treated among patients who recovered.	Rate per 1,000 of deaths to number of cases treated.
Department of:				
Texas	152	56	9	3
Missouri	128	40	9	2
East	102	35	9	0
Arizona	96	38	11	13
Platte	90	34	8	8
Dakota	82	32	11	4
Columbia	79	36	6	0
California	37	26	25	0
The entire army for the month	100	37	10	4
The entire army for the preceding decade, monthly average	142	44	?	7.5

Twenty-seven posts have shown admission rates for the month which were greater than the normal of 142 per 1000 of mean strength, and 117 less.

In the Department of Texas, 50 per cent of the posts gave admission rates above the normal. In the Department of the East, 22 per cent; in the Departments of the Missouri and Arizona, each 20 per cent; in the Department of Dakota, 14 per cent, and in that of the Platte, 8 per cent.

None of the posts in the Departments of Columbia and California gave admission rates above the normal.

The posts showing the highest rates were: Fort Lowell, Ariz. Terr., 382; Fort Hancock, Texas, 323; Jefferson Barracks, Mo., 321; Indianapolis Arsenal, Ind., 308; Fort Ringgold, Texas, 306; Springfield Armory, Mass., 255; Fort Apache, Ariz. Terr., 243; St. Francis Barracks, St. Augustine, Fla., 208 per 1000 of strength.

The lowest admission rates were: Fort McDermitt, Nev., 0; Angel Island, Cal., 0; San Diego Barracks, Cal., 0;* Fort Halleck, Nev., 0;* Fort Union, N. M., 11; Fort Stanton, N. M., 15; and Fort Columbus, N. Y., 20 per 1000 of mean strength.

Thirty-three posts have shown rates of constant non-effectiveness from sickness above the normal of 44 per 1000 of mean strength, and 111 below.

In the Department of Texas 57 per cent of the posts furnished rates of constant non-effectiveness from sickness above the normal. In the Department of Arizona, 35 per cent; in the Department of Columbia, 25 per cent; in the Department of the East, 20 per cent; in the Department of Dakota, 19 per cent; in the Department of the Missouri, 13 per cent; and in those of the Platte and California, 8 per cent each.

The posts showing the highest constant rates were: San Diego Barracks, Cal., 241;* Fort Lowell, Ariz. Terr., 183; Jefferson Barracks, Mo., 101; Fort Ringgold, Texas, 94; Fort Wadsworth, N. Y., 82; and Fort Brown, Texas, 81; while the lowest rates were: At Angel Island, Cal., Fort McDermitt, Nev., and Fort Halleck, Nev., 0; Fort Mason, Cal., 2; Watervliet Arsenal, N. Y., 6; Fort Sisseton, Dak.

* San Diego Barracks, Cal., has an average strength for the month of only 17 officers and enlisted men, and Fort Halleck, Nev., only 10.

Terr., 7; Eagle Pass., Texas, 7; and at Fort Gaston, Cal., and Fort Myer, Va., each 8 per 1000 of mean strength. At stations reporting high admission rates, diarrhœal diseases, malarial-fever, rheumatism, and neuralgia, together with injuries, have prevailed.

The causes producing high constant rates were the same as those producing high rates of admission, together with a few cases of more serious disorders, such as heart disease, pulmonary phthisis, nephritis, pneumonia, and venereal diseases.

Enteric-fever during the month of June existed at six stations, as follows: Fort Assinniboine, Mon. Terr., 2 cases,* both admitted during the month, 1 of which resulted fatally in 9 days. Fort Washakie, Wyo. Terr., Fort Davis, Texas, Fort Wayne, Mich., and West Point, N. Y., returned 1 case each as admitted during the month; at St. Augustine, Fla., 1 case was reported remaining from previous month.

Pneumonia existed at 9 stations, as against 12 for May and 18 for April. The cases newly admitted occurred at Fort Preble, Me., and at Watertown Arsenal, Mass., 1 each. Those reported from the other stations were cases remaining from previous months.

Eight cases of measles were reported at Columbus Barracks, O., at Jefferson Barracks, Mo., 2; and at Fort Preble, Me., 1, all newly admitted.

Erysipelas at Fort Schuyler, N. Y., 1 case.

Mumps at Fort Apache, Ariz. Terr., 1 case.

Whooping-cough at Fort Adams, R. I., 1 case.

The post-surgeon at Fort Assinniboine, Mon. Terr., in referring to typhoid-fever at that post, states in his monthly report: "Thus far I have not been able to trace the infection to its source. This is the first case of disease since I have been stationed here that has presented the typical symptoms of typhoid-fever, although it has been feared that the continued fever prevailing here every fall would eventually be replaced by typhoid-fever, as in many cases true typhoid has replaced the so-called mountain-fever of this region."

This surgeon further reports: "Owing to the very low stage of water in Beaver Creek, the quality of the drinking water is

* One of these cases is reported as "mountain-fever."

deteriorated, and there is great danger to health from its use in large quantities. It has been the history of the post that whenever the water in the creek runs low the amount of sickness is very much increased. During the latter part of this month two cases of typhoid-fever and two of diphtheria have occurred, not to mention an unusual number of cases of ephemeral-fever and diarrhœal attacks for the season of the year."

The post-surgeon at West Point, N. Y., in his report for Soldiers' Hospital, states that the case of typhoid-fever occurred in a member of the cavalry detachment, and that how or where he contracted the disease he has been unable to ascertain. Malarial-fevers have continued to prevail during the month, and cases of tonsillitis have been frequent.

Reports received from 27 commands operating in the field showed an aggregate mean strength of 1387 officers and enlisted men.*

One hundred and one cases, or 73 per 1000 of mean strength, were admitted to sick report during the month, of which number 8 were transferred to permanent stations for treatment, and appear upon their returns.†

Of these admissions 77, or 76 per cent, were for disease, and 24, or 24 per cent, for injuries.

Fifteen commands were operating or *en route* in the Department of Arizona, their strength aggregating 937 officers and enlisted men, with 54 cases of disease and injury, or 58 per 1000. Four commands in the Department of the Missouri, representing a total mean strength of 171, with 7 cases of disease, or 41 per 1000. In the Department of the Platte 3 commands, aggregating 167 officers and enlisted men, with 29 admissions to sick report, or 174 per 1000. In the Department of the Columbia 2 commands, aggregating 73 officers and enlisted men, with 8 admissions to sick report, or 110 per 1000. The Department of the East had 1 command, representing an average strength of 16 men, with 2 admissions to sick report, or 125 per 1000. The Department of California

* There were other commands in the field to which no medical officers were attached.

† To avoid duplication, these cases are dropped in the final consolidation for the entire army.

had 1 command, averaging 15 men for the month, with 1 sick, or 67 per 1000. The Department of Texas had 1 command, with a mean strength of 8 men, and none sick.

The prevalent disorders among troops in the field were diarrhœal diseases, malarial-fevers, diseases of the digestive system, and injuries.

Attached to the army, and living at the different military stations, were 5197 women and 6254 children, the wives, children, and servants of the officers and enlisted men.

Among the women were reported 413 cases of sickness during the month, or 79 per 1000 living. One death occurred, representing an annual death rate of 2.3 per 1000 living. The cause of death was reported as puerperal-fever.

Among the children 420 cases, or 67 per 1000, were taken sick. Twelve deaths occurred (11 of which were among those under five years of age), representing an annual death rate, at all ages, of 23.0 per 1000.

The causes of deaths among children were reported as follows: Cholera infantum, 2; remittent-fever, 1; capillary bronchitis, 1; inanition, 1; convulsions (from teething), 1; pneumonia, 1; diabetes, 1; albuminuria, 1; pemphigus, 1; acute opium poisoning, 1; and 1 still-born.

Whooping-cough was reported among the children at Fort Bayard, N. M., 16 cases, and at Fort Adams, R. I., 10 cases; the disease was also reported at Camp Poplar River, Mon. Terr., Fort Gaston, Cal., Presidio of San Francisco, Cal., Vancouver Barracks, Wash. Terr., and Fort McIntosh, Texas.

Scarlet-fever at Fort Marcy, N. M., 4 cases.

Measles at Fort Preble, Me., 3 cases; also reported at Watervliet Arsenal, N. Y.

Diphtheria at Fort Assinniboine, Mon. Terr., 2 cases.

Chicken-pox at Helena, Mon. Terr. (headquarters District of Montana), 2 cases.

Mumps at Fort Omaha, Neb., 1 case.

The post-surgeon at Fort Bayard, N. M., in his report states: "An epidemic of whooping-cough prevailed among the children at the post during the month; type, thus far, mild."

From Fort Adams, R. I., the following is reported: "Whooping-cough, which is prevalent in the city of Newport

and vicinity, was brought to this post early in the month, since which time there have been 10 cases, 9 children and 1 adult. The type is mild."

From Fort Marcy, N. M. : "Scarlet-fever is still prevalent in the city *of a very severe type*, very few cases recovering without swelling of the glands of neck, and a large number going on to suppuration and ulceration, with large sloughs. All cases of whooping-cough are convalescent."

The post-surgeon at St. Francis Barracks, St. Augustine, Fla., in his report to this office for June, states : "Measles of a severe type was quite prevalent in the town during the late winter and spring. It is now notably decreasing. Many cases proved fatal.

"Intestinal diseases have been and are still quite prevalent in the vicinity, confined principally to children, in many cases being the sequelæ to measles."

From Fort Preble, Me. : "The four cases of *rubeola* reported (among soldiers and civilians) were all in one family, the disease having been contracted at Portland, Me. ; otherwise the sanitary condition of the post is excellent."

The post-surgeon at Fort Brady, Mich., states : "Six cases of small-pox, with 2 deaths, occurring within 36 miles of this post, were reported to me. The infection has been traced to a man who came from Owen Sound, Ontario, Canada, on one of the steamers of the Canada Pacific Line, these boats passing through and stopping here twice a week. I have recommended that the entire command be re-examined as to the condition of their vaccine cicatrices, with the view of re-vaccination in cases in which there is any doubt."

The post-surgeon at Fort Bliss, Texas, reports : "Four cases of small-pox in the adjacent town of El Paso, Texas."

Of non-infectious diseases, malarial-fevers, diarrhœal disorders and diseases of the digestive system, together with catarrhal affections, have also prevailed during the month among children at army stations.

BENJAMIN F. POPE,
Major and Surgeon U. S. Army.

RECORD AND PENSION DIVISION
SURGEON-GENERAL'S OFFICE,
WASHINGTON, D. C., October 1, 1886.

SIX YEARS' SANITARY WORK IN MEMPHIS.*

By G. B. THORNTON, M.D., President of Memphis Board of Health.

THE interest taken in the public health and sanitary reforms in the city of Memphis since the yellow-fever epidemics of 1878 and 1879 by sanitarians, its citizens, and others, by reason of their business relations, have suggested this essay. Moreover, as this Association has been invited to hold its next annual meeting there, it is thought proper to give in detail some information concerning these reforms and their results which might be of interest to those engaged in the study of sanitary science.

No city in the country except, perhaps, New Orleans, has attracted more attention from a sanitary point of view, or suffered more in public estimation from a disregard of the laws of public hygiene, nor has any city ever recuperated more rapidly, or exhibited in the same length of time a more vigorous vitality. There is now reason for entertaining the hope that the business and social life of Memphis will never again be disturbed by serious epidemic disease. It is claimed that more sanitary work has been done there in the given length of time than in any other city of like size in the country, and the good results already obtained encourages the belief that a higher health standard may yet be reached, and successfully maintained by persistent effort in the methods and sanitary reforms instituted by the government in 1879.

The great losses to the city by the epidemics before alluded to in life, removal of its citizens, diversion of its trade, and, as a consequence, depreciation of its property, both real and personal, with the danger apparent of still further shrinkage from bad repute, induced the government and people to do all in their power to reclaim their lost wealth and influence by removing the causes which led to and resulted in this state of things. These reforms, as they related to Memphis, involved

* Abstract of paper read before the American Public Health Association, Toronto, October 6th, 1886.

two questions: one of local sanitation, and the other the prevention of the introduction of infectious diseases from elsewhere.

The topography of the ground upon which the city was built, and a want of sanitary precautions as it grew from an unimportant river village to an important commercial centre, is an interesting study in this connection, and plays an important part in those factors which maintained a high death rate from endemic diseases, and facilitated the spread of exotic diseases when introduced at seasons of the year favorable to their spread. The high bluff upon which the city stands affords many natural advantages over the surrounding country and other localities of the Mississippi Valley; and these advantages alone were too much relied on for preservation of the public health. With the experience of the past, and aided by the light of sanitary science, it is instructive to follow the growth of this city, and note the changes in grading high places, filling up depressions, diverting natural watercourses, together with accumulations of filth and waste, incidental to population, thoughtlessly left to pollute the soil, contaminate the drinking water, and add evil influences to natural unsanitary conditions. To correct these evils, both natural and the result of ignorance and negligence, is the work of the sanitarian, that requires time and money as well as the education of a community out of its primal prejudices. The site of Memphis on the fourth Chickasaw bluff, near where Wolf River empties into the Mississippi, in latitude 35.08, 315 feet above sea level, is naturally one, notwithstanding abrupt elevations and deep depressions, requiring the skill of the engineer to prepare it for habitations.

Bayou Gayoso, rising in the southern suburbs of the city, runs in a north-westerly direction, nearly through its geographical centre, and empties into Wolf River. This bayou and its branches afford the natural drainage for nearly the whole city, and a large area of country east and south of it. It may be described as a deep, crooked ravine, widening near its mouth, having a fall of some ninety feet in four miles, through which in periods of heavy rains the water rushes in great volume, while in the intermission of rainfall it shrinks to the proportions of a rivulet, excepting in the spring, when its

banks are filled by the back-water of the Mississippi River almost to the heart of the city. This bayou has always been an important factor in considering the question of local sanitation.

Memphis of to-day presents very few of the features characterizing its early life. The grading of its streets, filling of low, wet places, and the changing or obliterating of many small water-courses has so altered its physical appearance that the visitor now would scarcely recognize its topography of fifty years ago. The site was first surveyed for a town in 1819. At first the growth was slow; by United States census of 1830 its population was 663; of 1850, twenty years after, 8841, 2480 of which were colored. During these years cases of cholera, yellow-fever, small-pox, and other infectious diseases occurred, but there is no authentic record of any epidemic from either. The growth of the city from this date was more rapid, but very little attention was paid to measures looking to the preservation of the public health. Cases of yellow-fever are known to have been taken from boats from New Orleans and died in the city and city hospital, from which there was no spread, or at least none to attract special attention, though no precautions were taken to prevent infection. The earliest official records now obtainable, if there were ever any, of the presence of either yellow-fever or cholera, are in 1851, which show 93 deaths from cholera. Both diseases are known to have been in the city previous to that period, but there exists no authentic record of the number of cases or deaths from either. There are, however, official records of deaths from yellow-fever and cholera in 1852–53–54 and 1855. From 1856 to the close of the civil war in 1865, there are no records. In 1866 an official register for part of the year only shows a total number of deaths from cholera of 402, which is incorrect, and falls short of the actual number.

In 1867 cholera and yellow-fever both prevailed. The official register shows 259 deaths from yellow-fever; the first case officially reported in September, and the last in December. The disease this year was not general, but was confined to certain districts. Boards of Health up to this time, when organized, were nothing more than advisory bodies, whose advice when given was not followed, their functions and utility

not being properly appreciated. They were organized for emergencies, and generally suspended with the disappearance of danger. All attempts toward local sanitation and all restrictive measures were of a spasmodic character, being brought into requisition by the presence of epidemic disease for immediate relief, or to allay panic, and for the time satisfy a public sentiment.

In 1873 yellow-fever was officially announced in Memphis September 14th, though a number of deaths had occurred from the disease previous to that date which were not recognized as such, there being a diversity of opinion among the physicians as to its true character. The last case officially reported was in November. The official record shows 1244 deaths.

It would seem, with the experience of these several visitations of yellow-fever and cholera, the authorities and people of Memphis would have acquired sufficient wisdom to guard against a repetition of epidemic from either in the future.

The great yellow-fever epidemic of 1878, which was general over the South-west, taught Memphis its severest lesson, and marked an epoch in the sanitary history of this country. The population of the city then was estimated at 55,000. The first case was officially recognized in the city hospital August 2d. This case was that of a man taken from a New Orleans steamboat, who remained in the city two days prior to his admission into the hospital. On August 3d he was removed by the health officer to the quarantine station, eight miles below the city, on President's Island (Mississippi River), where he died. The first case reported by the Board of Health among the citizens was on August 13th, the last death December 10th (a returned refugee); but it is evident that deaths occurred in the city between August 1st and 13th, and perhaps earlier, but as usual the disease was not recognized, and consequently deaths were reported as from other causes. This, too, may have been the case in some instances during the progress of the epidemic, and *vice versa*. The official register at the health office shows the number of deaths from yellow-fever 2779 in the corporation. The death register of the Howard Association shows 4913 deaths, and gives name, date, and locality. It includes city and suburbs, and

the country adjacent to which they had sent their physicians and nurses. In addition to this, it also furnishes a separate list of 109 names of refugee citizens in whom the disease was developed after leaving the city, and who died elsewhere, making a total of 5022.* This epidemic, which extended over such a vast area and involved such a number of places, so aroused the country to the importance of preventive measures that a new impetus was given to the study and application of sanitary science, and this state of public feeling led to the organization of the National Board of Health and many State and local Boards.

The epidemic of 1878 in this city beggars description, and is only briefly alluded to here, since it attracted such wide attention, and was the cause of special legislation, both State and national, and led to the great reforms which have reclaimed Memphis and demonstrated what a community can do by well-directed energy aided by science, in face of adverse circumstances. On its subsidence the city was literally paralyzed, besides being in a worse sanitary condition than ever before. A demoralization seemed to pervade the whole community, and a general distrust in the city government to administer its affairs to the best interest of the people was universally felt. The winter passed without an effort being made, worthy of mention, by the authorities toward sanitary work. The city being bankrupt and largely in debt, without credit at home or abroad, could do nothing. Moreover, there was a want of appreciation of the true state of affairs. All

* See History of the Yellow-Fever Epidemic, 1878, by J. M. Keating, Memphis. Published by Howard Association. In this connection the following foot-note to page 116 is herewith added as germane to this subject, though the number of deaths, 5150, differs from above text:

"The medical estimate (Howard Association Medical Corps) puts the total population, during the epidemic, at 19,600, and the total sick at 17,600, the deaths as stated being 5150, a little less than one third. Members of the Howard Visiting Corps, who have resided in the city many years and know it well, and whose business, during the epidemic, it was to visit every ward every day, say that at no time was there more than 20,000 persons in the city, if so many, and that of these fully 14,000 were negroes, leaving only 6000 white people. Of the 14,000 negroes 946 died of the fever, and of the 6000 whites 4204 died, being 70 per cent. of the whole number. Not more than 200 white people escaped the fever, and most of these had been victims of it in previous epidemics."

prominent citizens agreed that something should be done, but in view of the condition of the city's business and the general demoralization, it was difficult to determine specifically the best course. The plan finally adopted, while novel and radical, met with strong opposition at first, but proved in the end the wisest.

On petition of the citizens of Memphis the State Legislature, which met that winter, took away the charter of the city, and passed a law putting the local government into the hands of seven commissioners, authorized to administer the affairs of the city *as a part of the body of the State*, called the Taxing District of Shelby County. This commission, designated the Legislative Council, was at first appointed by the Governor, and subsequently elected by the people. (For detail of this law, see Acts of the General Assembly of Tennessee, 1878–79.) The new government commenced the work of reorganization and reformation in February, 1879, with an empty treasury, a disheartened community, and the constitutionality of the law creating it yet to be settled by the Supreme Court of the State. Among other things, this law created a Board of Health, and defined its duties and jurisdiction. It provided that there should be elected annually by the Legislative Council a President who should be a physician of at least five years' residence, with power to appoint a Secretary who had graduated in medicine, a health officer invested with police powers, and the chief of police member *ex-officio*, all to give an official bond for the faithful discharge of duty. The President of the legislative council, who corresponds to Mayor, was also made a member *ex-officio* of this Board. The old health ordinances were revised, added to, and changed to apply to the new order of things.

The first practical step toward local sanitation, after organization, was to remove from the public thoroughfares and private premises the accumulations of the past six months of garbage, waste, and refuse of every conceivable character incident to population. The health ordinances were enforced as rigidly as practicable, both in regard to private property and public places. A corps of sanitary police, who reported directly to the Board of Health, made daily inspections and brought delinquents before the police court. It is but just to

say that the majority of individuals responded cheerfully to the requirements, being impressed with the necessity for such work, while others exhibited an indifference amounting to opposition. A public garbage service, with all necessary appliances, was organized, and has been since operated under the immediate supervision of the health officer. In this early work the authorities were assisted by an organization of citizens, known as the Auxiliary Sanitary Association, which was maintained by voluntary contributions, and co-operated with the health authorities, aiding with their means and moral support.

Yellow-fever reappeared in July, 1879, and its management which followed demonstrated the fact that a city the size of Memphis may be the subject of infectious disease without the infection extending to other communities. On its outbreak the population was estimated at 40,000. By July 28th, by voluntary and forced depopulation, it was reduced to 16,110, of which 4283 were white and 11,827 colored, and it is estimated that of the total number 5645 were not protected by previous attack. The first case was reported July 8th, the last November 15th; number of cases reported, 1532; white, 853; colored, 679. Total number of deaths, 485; white, 379; colored, 106.

From the commencement to the close of this epidemic, the National and State Boards of Health co-operated with the local authorities.

In December following, by invitation of the authorities, the National Board of Health commenced a thorough house-to-house inspection and sanitary survey of the city, with the view of indicating what was specifically necessary to be done in order to place the city in proper sanitary condition. The commission assigned to this duty furnished the local health authorities schedules of nuisances as the work progressed.

The main points indicated may be briefly stated to be:

1. A complete system of sewerage and subsoil drainage embracing the whole city.

2. The emptying, disinfecting, and filling with fresh earth all privy vaults, and substituting earth-closets or water-closets in their stead when sewer connections could be made.

3. A thorough cleansing of cellars and premises.

4. Removal of the wooden block Nicholson Street pavements (of which there were nine miles mostly in a decayed condition), and replacing them with some character of stone.

5. The destruction or renovation of all unsanitary houses, and the prevention of the erection of others, either for business or residence purposes, without a permit from the engineer's office prescribing certain sanitary rules.

6. A discontinuance of the use of cisterns and wells containing impure water.

7. The improvement of the public water supply.

8. A treatment of Bayou Gayoso and its branches.

9. The perfecting and maintenance of a public health service, involving the daily removal of house waste and refuse.

This work has steadily advanced since its commencement, and the health service enlarged each year as the growth of the city demanded and its revenues justified. The average annual current expense for six years in maintaining the health service, exclusive of sewer construction or repairs, which belongs to the engineer's department, is $22,726.68, as shown by the annual reports of the Board of Health, to which reference is made for detailed information of expense and work done.

SEWERAGE.—The main sewers are located on each side of the bayou and as near to it as practicable, and discharge by one main conduit. The mains are ten, twelve, fifteen, and twenty inches in diameter. Of the laterals about eighty-five per cent are six inches in diameter and the remainder eight inches, except a few short lengths which are ten inches. The mains, for the most part, are laid with a grade of two inches in one hundred feet, which is the minimum. The minimum grade of six-inch laterals is six inches in one hundred feet. At the upper end of each lateral is located one of Roger Field's automatic flush tanks, which discharges one hundred and twelve gallons of water in about forty seconds. It discharges as soon as filled, but it is believed once in twenty-four hours is sufficient. Each tank cost, complete, about forty-five dollars, including ten dollars royalty. The mains are provided with manholes and the laterals with observation openings. No surface water is permitted to enter the sewers, the system being designed and proportioned for house sewage only. The house connections are four inches in diameter, and no trap is

permitted on the main drain, each fixture being provided with a separate trap. The soil pipes to closets are four-inch cast-iron, with lead joints above the ground, and extend four inches above the roof. Each house drain is consequently a ventilator for the public sewer. No trouble has been caused by sewer gas, and the sewers are believed to be comparatively free from it, the constant flushing preventing decomposition and its formation. Occasionally the six-inch laterals have been obstructed by sticks, bones, or some substance not intended to pass through them, which are removed at an average cost of ten dollars each, as seen by accompanying table. Occasional deposits of silt or paper are found in the mains, which are easily and inexpensively removed by the passage of hollow metal balls through them. These balls are about three inches less in diameter than the sewers, and being lighter than water, are pressed against the top of the sewer and are rolled along by the force of the current. The velocity of the ball is less than that of the water, which, in passing, is deflected against the bottom and sides of the sewer so as to thoroughly cleanse it. For the purpose of removing the subsoil water, agricultural drain-tiles are laid in the trench with each lateral on the grade of the sewer, or below it; they discharge into the bayou.

Thirty-eight and a quarter miles of new sewers (38¼) have been laid, which, with the four miles of old sewers, makes forty-two and a quarter miles of sewers now in successful operation, and thirty-six miles of subsoil pipes, and one hundred and ninety-eight flush tanks. The cost of this sewer system since 1880, as furnished from engineer's office, is as follows:

Cost of removal of obstructions	$3,769.05
Average cost of each obstruction	10.40
Total cost of cleaning main sewers	1,675.35
Total cost of sewer system	316,843.82
Deduct from this obstructions removed, house connections, cleaning, etc., which will leave for sewers proper	291,600.62

The nine miles of wooden block Nicholson pavement has been removed, and there are now twenty-two and a half miles of newly-paved streets, mostly with stone and gravel, which has greatly improved the surface drainage.

THE WATER SUPPLY for drinking was first obtained from shallow wells and cisterns, many of which, being defective in structure and becoming impure from seepage, the washings of roofs, and other sources of pollution, caused fevers and bowel affections.

Under the operations of the Board of Health many of these cisterns and wells have been abandoned and others made unobjectionable. More care is now taken in the construction of cisterns, and the supply from this source vastly improved. This has contributed materially toward the improvement of the general health of the city. In 1868 the city had a topographical survey made, with the view of establishing a system of sewers and a public water supply at a cost of $43,000. It has been erroneously thought by many that the present water works, which furnishes the public supply, was based upon this survey. The water company now owning and operating the water works is a private corporation, and had nothing to do with that survey, only so far as it served their purpose in the construction of their works. The supply at present furnished, though from Wolf River, one of the sources recommended by Mr. Hermany, the chief engineer of this survey, is not from the point indicated by him as suitable, but from one so near the city as to be objectionable because of the pollutions incident thereto.

It is the purpose of the city government to construct and operate its own water works, but preliminary to this some special legislation by the General Assembly is required before the scheme can be consummated. With this view the Legislative Council recently appointed a committee of ten prominent citizens, identified with the interest of Memphis and interested in its welfare, to consider and report on all points involved, looking to the improvement of the public water supply. This committee, through one of its members, General Colton Greene, has submitted a very exhaustive preliminary report to the Legislative Council.

QUARANTINE AND INSPECTION SERVICE.—Though a quarantine station was first established in 1874, eight miles below the city on President's Island, it was not used until the summer of 1878. That year it was opened too late to be of any

advantage, and was abandoned when yellow-fever became general in the city. In 1874 no quarantine was opened, as no yellow-fever was known to be south of Memphis before it was recognized there. In 1880 the National Board of Health was called on by the authorities in Memphis to establish a quarantine and institute an inspection service for steamboats and railroads, taking New Orleans as the initial point. It was apparent from the official records that yellow-fever had prevailed in New Orleans every summer to a greater or less extent for a number of years prior to this, and that in a community which had become so habituated to its presence it did not excite that apprehension which it would under other circumstances. It was therefore reasonable to suppose that cases might occur there which did not come under the observation of the health authorities, especially if no death was reported from the disease. But with Memphis it was different; in view of its past few years' experience the whole community, not only of the city, but the adjacent country, had become morbidly apprehensive, and these precautions after the advent of warm weather were deemed, not only necessary to guard against any real danger, but for its moral influence in allaying this sensitive feeling and give a confidence which otherwise would not exist. This service was maintained through the summer of 1880–81–82 and 1883. It created some ill-feeling and acrimonious correspondence, but was of great benefit to the whole valley country. In 1884 a change in the administration of the public health affairs of New Orleans and improved methods in their quarantine arrangements rendered it no longer necessary, as a confidence was then established through the lower Mississippi Valley which previously did not exist.

DEATH RATE OF MEMPHIS.—The best evidence of an improved sanitary condition of a place which has had a high annual death rate and been the subject of epidemic diseases, is freedom from epidemics and a comparatively low death rate.

Tables covering a period of eleven years, five years prior to the sanitary reformation and six years since—that is, from 1875 to 1886, show a decided improvement in the death rate,

due to sanitary work and the enforcement of the health ordinances.

Assuming the population for the first five years to be 35,000, the average death rate for the three non-epidemic years was 35 per 1000.

For the last five years the population has steadily increased, and is now estimated at 62,335, one third colored. The total deaths for 1885 were 1484; white, 666; colored, 818. Death rate per 1000, 23.80.

Though the colored population is about one third less than the white, it furnishes the majority of the deaths.

The average death rate for the last three years, 1883–85, has been 24.40 per 1000—a gain of about ten per cent.

BAD MILK.—Dr. H. A. Pooler, of Goshen, Orange County, read a paper before the recent meeting of the Fifth District Branch of the New York State Medical Association on "The Milk Supply of Large Cities, and the Improper Mode in which it is Conducted," in which he made a searching denunciation of the modern Herods who, urged on by the greed of gain, keep up a continual slaughter of the innocents by their iniquitous practices. In speaking of the adulteration of milk by the removal of fat and dilution with water, he quoted from the report of Professor C. F. Chandler, President of the New York City Board of Health, published in the second annual report of the State Board of Health (1881–82), that: "While a large proportion of the milk sold has been but moderately watered and skimmed, and is still above the standard of the poorest milk (two and a half per cent of fat), much of the milk has been *extended* and skimmed far below the standard. So openly are these frauds practised that 'creameries' have been established in many localities, the names of seventy-three such establishments being known to the writer, of which sixty-three are known to send skimmed milk to New York City, all of which is sold as whole milk on its arrival." These frauds, Dr. Pooler contends, are still extensively practised. And when such milk as this is further diluted by mothers before they give it to their infants as a substitute for breast milk, it can be readily seen how greatly the children fed upon it suffer in consequence.

The latter part of the paper was principally devoted to the evils resulting from the feeding of cows with brewers' grains and distillers' mash, which, he said, were directly injurious to the animals themselves, and, while they stimulated them in such a way that the quantity of milk given was considerably increased, they produced milk of a very inferior quality. The facts showed that the action of this kind of food was to impoverish the milk in its most essential constituent, fat, and largely increase its most objectionable constituent, caseine. When the fat is not equal to the normal amount, the milk forms an exceedingly hard curd in its coagulation, which is known to the skimmed-milk cheese-makers as "hickory curd." A number of beautiful micro-photographic illustrations, projected upon a screen by E. W. Martin, Ph.D., Chemist to the New York Board of Health, added not a little to the interest and attractiveness of the paper.

An extended discussion followed, and in the course of it Dr. A. N. Bell called attention to the fact that milk from diseased cows sometimes contains a large amount of fat; this being particularly the case, it is said, with milk from animals suffering from rinderpest. Among the other speakers was Dr. E. R. Squibb, of Brooklyn, who stated, what is undoubtedly a fact, that notwithstanding all the frauds that are practised upon the community, the milk supplied at present to the cities of New York, Brooklyn, and Jersey City is, as a rule, of a better quality than was formerly the case.

THE ALBUMINOIDS OF MILK.

By A. Dogiel.

1. *Peptones.*—As a result of his investigation of cow's milk, Schmidt-Mülheim states that it contains peptones, the proportion varying from 0.08 to 0.19 per cent of the milk (*Pflüger's Archiv*, 28, 287). Hofmeister, on the other hand, denies that they are present, and in human milk likewise (*Zeits. physiol. Chem.*, 2, 288). In further investigating this question, the author sought first to ascertain the probable error inherent in the method of isolating the peptones. For this purpose known quantities of peptones were added, and the milk was then treated with ferric chloride solution in the

usual way for the separation of other proteids; the peptones were estimated in the filtrate by means of a comparative colorimetric determination based on the biuret reaction. In nineteen experiments in which 40 c.c. of milk were taken for each, the quantities of peptones added varied from 0.004 to 0.020 gram, and the solutions finally obtained, after precipitation and washing, amounted to 190—250 c.c. The ultimate result was to show that the quantity of peptone retained by the precipitate was independent of the amount added, the quantity lost being approximately 0.005 in each experiment—that is, 0.0023 for every 100 c.c. solution ultimately obtained. That the peptone is retained by the precipitate is proved, according to the author, by the diminished loss which is noted when the iron oxide precipitate is boiled with water, and this aqueous extract added to the solution. By varying the quantity of milk, it was found that the loss of peptone remained equally uninfluenced.

On the basis of the experience of these blank experiments, the author proceeded to the examination of normal specimens of cow's and woman's milk, adopting special precautions in the isolation by precipitation of the peptones presumed to be present. In all cases, however, negative results were obtained. Having further repeated Schmidt-Mülheim's experiments (*loc. cit.*), and found that the substance supposed by him to be a peptone is a residue merely of one of the normal proteids of milk, the author finally concludes that these milks do not contain peptones.

2. *Caseins.*—The author has isolated, with special precautions, the caseins from woman's and from cow's milk for the purpose of instituting a comparison of their properties. Having found that their reactions were substantially identical, he examined the products of their artificial (peptic) digestion, which proved to be identical also, and there can be no doubt therefore that they are, chemically, very closely related.

3. *Other Proteids.*—In a comparative examination of the products of peptic digestion of the two milks, by the optical method, the author found the rotation to be fifty per cent greater in the case of the products from woman's milk, whence he concludes that in regard to the proteids, not peptones, the two milks are differently composed. He suggests that the difference may be chiefly in respect of the lacto-albuminoid recently described by Sebelien (*ibid.*, 9, 403).—*Jour. Chem. Soc.*, 1885, p. 1149; *Zeits. physiol. Chem.*, IX., 591.

INTER-STATE NOTIFICATION IN INFECTIOUS AND CONTAGIOUS DISEASES.

THE following resolutions, presented by the National Conference of State Boards of Health, were adopted by THE AMERICAN PUBLIC HEALTH ASSOCIATION at Toronto, October 8th, 1886:

"*Whereas*, It is necessary for the protection and preservation of the public health that prompt information should be given of the existence of cholera, yellow-fever, and small-pox; be it

"1. *Resolved*, That it is the sense of the National Conference of State Boards of Health that it is the duty of each State, provincial, and local Board of Health in any locality in which said diseases may at any time occur, to furnish immediately information of the existence of such disease to Boards of Health of neighboring and provincial States and to the local Board in such States as have no State Board.

"2. *Resolved*, That upon rumor or report of the existence of pestilential disease, and positive, definite information thereon not being obtainable from the proper health authorities, this Conference recommends that the health officials of one State shall be privileged and justified to go into another State for the purpose of investigating and establishing the truth or falsity of such reports.

"3. *Resolved*, That whenever practicable, the investigations made under the preceding section shall be done with the co-operation of the State or local health authorities.

"4. *Resolved*, That any case which presents symptoms seriously suspicious of one of the aforenamed diseases, shall be treated as suspicious and reported as provided for in cases announced as actual.

"5. *Resolved*, That any case respecting which reputable and experienced physicians disagree as to whether the disease is or is not pestilential, shall be reported as suspicious.

"6. *Resolved*, That any case respecting which efforts are made to conceal its existence, full history and true nature, shall be deemed suspicious and so acted upon.

"7. *Resolved*, That in accordance with the provisions of the foregoing resolutions, the Boards of Health of the United States and Canada represented at this conference, do pledge themselves to an interchange of information as herein provided."

In addition to the foregoing resolutions presented by the National Conference of State Boards of Health and adopted by the American Public Health Association, the following from the *Advisory Council* of the Association were also adopted:

"*Whereas*, It is necessary for the protection and preservation of the public health that prompt information should be published of the existence of cholera, yellow-fever, and small pox:

"1. *Resolved*, That the American Public Health Association believes it to be the duty of each State and provincial Board of Health within whose jurisdiction one of these diseases shall appear, to give immediately notice of the existence of the same to neighboring State and provincial Boards of health, and to the Boards of towns and cities in neighboring States and provinces which have no central Board. In such States and provinces this duty of notification lies upon the local Boards.

"2. *Resolved*, That it is the sense of this Association that whenever rumors of the existence of pestilential disease in a State or province prevail, and, upon application to the health authorities of said State or province, information respecting the truth of the rumor is refused, the health officials of another State or province are justified in entering the before-mentioned State or province for the purpose of investigating and establishing the truth or falsity of such rumor.

"In conducting the investigation, every reasonable effort should be made to co-operate with the health authorities of the locality.

"3. *Resolved*, That a case which so nearly resembles one of the specified diseases as to raise a reasonable suspicion of its character, or a case in which concealment is attempted, ought to be reported as a suspected case, in the same manner as if the diagnosis were certain.

"IRVING A. WATSON, Secretary."

THE RELATIVE VALUE OF OBSERVATIONS OF ATMOSPHERIC OZONE COMPARED WITH THOSE OF OTHER ATMOSPHERIC CONDITIONS, AND A CONSIDERATION OF THE COINCIDENT RELATIONS OF ATMOSPHERIC OZONE TO SICKNESS.

By A. W. Nicholson, M.D.

At the time of its discovery, atmospheric ozone was looked upon as matter so well defined and, theoretically, so clearly necessary to the well-being of man, that now it appears somewhat anomalous that questions of doubt should arise as to the value of ozonoscopic observations. These possibly may be due to the fact that inquirers into the subject have not had sufficient data pertaining to such observations and to other coincident conditions from which to make proper deductions; also, to unsettled opinions relative to the proper method of taking observations of atmospheric ozone. The best method known, and the one now generally adopted, is the iodide of potassium and starch test, with a scale for comparison of ten degrees of coloration. This method is the one that has been employed by the corps of observers of ozone for the Michigan State Board of Health since 1876, and the one adopted by Dr. Kedzie in his systematic observations since 1878. In December, 1884, the State Board of Health of Tennessee inaugurated the same method for a series of observations through a corps of observers of ozone in different parts of that State. I believe that Michigan and Tennessee are the only States in the Union where systematic observations of ozone by a corps of observers are now being taken by any method, though here and there there are individuals in other parts of the country who are taking such observations at the suggestion of some society, or because of their own interest in the subject.

The principal objection raised relative to the value of ozonometric (or ozonoscopic) observations undoubtedly have reference to errors in the "test." Mr. Fox specifies these as follows:

(1) Impurity of chemicals; (2) of paper; (3) formation of iodate of potash; (4) non-union of the whole of the liberated iodine; (5) changes in the force of the wind; (6) bleaching of colorized test from formation of iodate of potash, excess of moisture in the air, high temperature in the air, (?) a great velocity of the air, a long exposure to the air, sulphurous acid in the air, and true antozone; (7) light; (8) ozonometers faulty in construction (under which head errors 1 and 2 would seem properly to belong); (9) differences of aspect and elevation. This last appears to me to be not indicating error in the test, as usually employed, but rather a difference in the quantity of ozone present, due to differences of aspect and elevation. The germicide properties of ozone are now so well recognized I would think another error might possibly arise from the decomposition of ozone by union with atmospheric germs, which might find a nidus for cultivation in the moist starch of the ozonoscope itself. There is another error, dependent more upon the observer himself than upon the test, and that is his inability at all times to distinguish and record the actual *shade* of color represented by the ozonoscope. This error may arise from the amount of light present at the times of reading the test; to the existence of partial color-blindness on the part of the observer; or to the fact of the frequent actual variation in color between the ozonoscope and the colors of the scale. This variation may exist even when the scale is divided into twenty different shades. In a series of observations taken at Ealing, a suburb of London, England, by Mr. Ramsey, editor of the *Scientific Roll*, and at Lansing, Mich., by myself, at the same hour of the day, where the comparison each time was made with a scale of ten degrees and one of twenty, the result showed that the ratio of the degrees recorded, by comparison with the two scales, at times widely varied. This shows that too great care in readings cannot be made.

The question thus arises, Do the results of ozonoscopic observations approximate the truth sufficiently to be of value? The long series of observations already taken in Michigan seem to fairly prove that the *means* of *these* observations eliminate the errors that may be present as well as the means of observations relative to other atmospheric conditions eliminate

the errors pertaining to them. In a letter which I received from Dr. Henry B. Baker several years ago, he wrote: "I am satisfied that the results of observations of ozone are probably about as reliable as are results of many of the so-called instruments of precision. I think we get nearly as good an idea of ozone as we do of temperature, and perhaps better than we do of atmospheric pressure." * Considering the difficulty of arriving at the truth pertaining to absolute and relative humidity, or the different results obtained relative to humidity by the use of the best-known formulæ, these conditions may also be added, as possessing doubtful value, to those specified by Dr. Baker. There are many circumstances tending to produce error in the record of single observations pertaining to all these conditions, but the means of a considerable series of observations pertaining to them show them to be governed by laws so definite that they would seem to possess such value as to render useful the deductions made from them. Yet Professor Albert R. Leeds claims that there is an apparent lack of connection between the ozone record and those of other meteorological conditions.†

One of the most general of laws observed in regard to atmospheric ozone coincident with other atmospheric conditions is, that during the year the numerical value of ozone is inverse to the numerical value of temperature. During the season of high temperature there is a low value of ozone, and during the season of low temperature there is a higher value of ozone. Computations of means of seventeen years pertaining to cloudiness and nine years pertaining to ozone, from observations published in the Reports of the State Board of Health of Michigan, show how close the relation is between the per cent of cloudiness and the amount of day and of night ozone, the scale of ozone being reduced to hundredths. They also show that the range in the quantity of ozone is greater during the night than during the day; that the quantity of night ozone is greater than that of the day ozone from the 1st of October till the middle of May, and less from the middle of May to

* The causes of errors in thermometric readings are well shown in Signal Service Notes, No. XXII., entitled "Corrections of Thermometers," recently published.

† Annals of the New York Academy of Sciences.

the 1st of October. The great activity of vegetation in Michigan from the middle of May to the 1st of October, in connection with the greater amount of sunshine at that period, probably accounts for the greater quantity of day ozone during that time. The increased cold at night may account for there being a greater quantity of night ozone at other times of the year, when there is an absence of growing vegetation.

Not only do these conditions obtain for a series of years, but they also quite generally correspond with each single year.

The obedience of the test to the influence of impurities of the air in conformity with the general opinion that there is less coloration when the test paper is exposed to such an atmosphere than when not so exposed, is an argument in favor of the value of ozonoscopic observations as an approximate measure of such impurities, and it may be that therein lies their greatest value. It is a common opinion that in those seasons of the year when there is the greatest amount of oxidizable matter in the air, as has been observed in times of cholera, there is the least evidence of ozone, oxidization being carried on at the expense of the ozone. In an article relative to atmospheric ozone published in the Report of the State Board of Health of Michigan for 1880, and also in the Second Report of the State Board of Health of Tennessee, I gave results of experiments showing the difference between the quantity of ozone found existing near decomposing animal excreta, and that found one hundred feet distant from any such contaminating influence. The following is the exhibit :

Date 1879.	Impure Air.		Pure Air.	
	Night.	Day.	Night.	Day.
June 9.....	2.5	3.5	4.5	3.5
" 10.....	2	2.5	3.5	3.5
" 11.....	1	3	2	3
" 12.....	2	2.5	2.5	3
" 13.....	3	..	3.5	..
" 14.....	3	3	3.5	3
Average.....	2.3	2.8	3.3	3.2

As insignificant as the difference may appear, it is important enough, in a sanitary point of view, to warn us of the danger of subjecting ourselves to the influence of such an atmosphere.

It is also plainly demonstrated that in seasons of the year when the air is most dangerous from filth, diseases characterized to a great degree by their relations to filth are most prevalent. To illustrate this point I have computed the monthly means of three years of observations of ozone, and the means, for the same years, of the per cent of reports, stating the relative prevalence of typhoid-fever, cholera-morbus, and diarrhœa in Michigan, reported to the State Board of Health.

The respiration of pure ozone, it is well to know, leads to irritation of the mucous passages. It is by some considered somewhat doubtful, however, if atmospheric ozone, especially in the quantity detected by any known test, can be said to have any appreciable effect upon animal life in relation to sickness as a cause, *per se*, as it is impossible to eliminate the effects of other atmospheric conditions existing at the same time, like that of great ranges of temperature and atmospheric pressure. In general the natural vitality of a healthy person is such as to enable him to resist, with ordinary precaution, most perturbations of the atmosphere. However, some correlation between the amount of ozone in the air and sickness *seems* to exist. According to observations made by myself in 1877 in regard to ozone and more than one hundred cases of intermittent-fever, I found that there was more than the average of ozone during those months when there was the smallest number of cases, and less than the average of ozone when there was the greatest number of cases. Dr. Baker has repeatedly observed and shown, in the reports of the Michigan State Board of Health, how close a coincidence occurs between the amount of ozone recorded and bronchial diseases. Such close relations assert the importance of further investigation in this direction. Observations have long since proven that there is little ozone to be found in cities, and it is a significant fact that the death rate is greater, and sickness is more prevalent in cities than in rural districts.—From *American Meteorological Journal.*

PEPSIN.

PEPSIN is described in the United States Pharmacopœia as "the digestive principle of the gastric juice obtained from the stomach of the hog, mixed with powdered sugar of milk."

It is required to dissolve at least fifty times its own weight of albumen.

The requirements of the British and German pharmacopœias are very low, considering that from their titles and wording they are not saccharated pepsins, but the ferment itself in its purest obtainable state.

The British Pharmacopœia alone of the three pharmacopœias gives a method of preparation, that of scraping the previously cleaned mucous membrane with a blunt knife or other suitable instrument, and drying the pulp thus obtained on glass plates, at a temperature not exceeding 100° F. The requirement of its digestive strength is very low indeed, considering that it contains no added substances—one grain being required to digest but fifty of coagulated albumen, while the United States Pharmacopœia article will dissolve the same amount, though it may contain many times the weight of the contained pepsin in sugar of milk.

The German Pharmacopœia, like the British, names the article simply pepsin, and recognizes no admixture with sugar of milk.

It is, however, required to possess a greater digestive strength, one part digesting 100 parts of albumen. It also prescribes the degree of fineness to which the albumen should be reduced, as does also the British Pharmacopœia.

After referring to these requirements of the different pharmacopœias, a writer in the *American Druggist* gives the following very practical method of assaying pepsin:

For the assay of saccharated pepsin, five two-ounce wide-mouthed vials are provided, and into each of them is weighed just one grain of the pepsin to be assayed. A quantity of

water and hydrochloric acid, in the proportion recommended by the pharmacopœia, having been provided, 507½ grains are weighed into each bottle, or a measure, graduated so as to hold 507½ grain-measures, used for measuring it into them.

The albumen from an egg, which has been boiled fifteen minutes and then cooled, is carefully separated from the yolk, and by means of a small spatula forced through a piece of brass gauze of 80 meshes to the linear inch.

The albumen is then quickly weighed in portions, placing 20 grains in one vial containing the pepsin solution, 30 in another, 40 in another, 50 in another, and 60 in the last. The vials are then corked, and the number of grains of contained albumen marked on the cork of each bottle, when they are placed in a water-bath and kept at 100° to 104° F. for four to six hours. They should be placed in a part of the bath removed from the source of heat if a direct flame is used, as the bottom of the vials, being in contact with the metal where the flame strikes it, would be much warmer than the water contained in the bath. It is preferable, where a steam water-bath cannot be used, to place the vials in a second vessel immersed in the bath proper.

It is necessary to shake the vials frequently, and to also remove the corks occasionally.

When the proper time has expired, the vials are removed, allowed to deposit all undissolved albumen, and the eye can readily read the result.

In some cases it may be found that all the albumen in each vial is entirely dissolved, and in others that they all contain undissolved portions in varying amounts, the one in which was placed the least containing but perhaps a trace, and from this to the greatest containing progressively greater amounts undissolved. Of course, this depends upon the activity of the pepsin.

In case of desire to assay an undiluted or "concentrated" pepsin, $\frac{1}{10}$ of a grain is weighed into each bottle, or 10 grains are carefully and well triturated with 90 grains of sugar of milk and 1 grain used, proceeding then as above. In case of small amounts of albumen remaining in the bottle containing the least amount, the eye soon learns to judge of the amount far more accurately than could be determined by weighing.

Pepsin contained in gastric juice in the proportion of three one thousandths was first discovered and made in 1839 by Th. Schwann. Its elementary composition is unknown, and despite the hard word bestowed upon it for a name, has never been obtained in a state of chemical purity. It is looked upon as a nitrogenous substance, coagulates at 212° F. when in the wet state, but dry preserves its activity and virtue at 230° F. When dissolved in water it undergoes at 104° F. a transformation into isopepsin, and upon increasing the temperature to 210° F. all its virtues are then lost. Alcohol dissolves it; anhydrous alcohol precipitates it from the solution in white flakes, as do also all the metallic acetates, chlorides, and sulphates. Pepsin forms in the gastric juice and in the cells of the outer coating of the stomach; it is associated but not chemically combined with an acid, and it is only when acid and mixed in water that its virtues are manifested as a digestive. When placed in contact with albuminoids it induces fermentation and transforms the latter into what are known as peptones.

Some writers believe that pepsin is one of those ferments depending upon or perhaps consisting of a low form of immature animal life, but the microscope has so far not enabled us to prove this.

PREPARATION OF MEDICINAL PURE PEPSIN.

Directly after slaughtering, the rennet bag is taken from the stomach and divested of every trace of food or foreign body. The bag is then thoroughly washed and the mucous membrane scraped with a blunt knife. The result is a pulpy substance weighing about two ounces to each stomach; this is macerated in three times its weight of water for two hours with frequent shaking and filtered through linen; to the liquid is added three drachms of solution of neutral acetate of lead; an abundant precipitate forms which is washed several times with water; it is then charged with sulphuretted hydrogen gas, in large excess, filtered and evaporated to dryness to about 112° F. Thus prepared it should dissolve seventy times its weight of wet fibrine in twelve hours. Other processes are to steep the whole of the stomach in hydrochloric acid and precipitate the pepsin by a saturated solution of common salt.

Having thus stated what pepsin is, and how it can be tested, we will add that, as already indicated, the United States Pharmacopœia recognizes saccharated pepsin only—that is, pepsin containing ninety per cent of sugar of milk to every ten per cent of actual pespin. In France, starch is employed in place of sugar of milk. It will therefore be readily seen that if a pure pepsin, that is, an undiluted or concentrated pepsin could be manufactured, it would be more than ten times as strong as either the saccharated or amyl pepsin. Such has been made, and is known variously as concentrated, crystallized, and scale pepsin. It would, of course, be stronger than the diluted pepsin, not only in consequence of not being diluted, but also from the fact that the material used to dilute it tends to weaken the actual pepsin by its peptonizing action thereon. Again, a well-made scale pepsin, being hard and dry, is not liable to be attacked by infusoria and bacillæ.

Physicians when prescribing any remedy naturally desire to use that which is most reliable, even in strength, and always to be depended upon, and when they have once decided which preparation they will use in their prescriptions, want to be certain that that particular preparation is the one used by the apothecary, and therefore they should be careful to add the name of the manufacturer whose goods they wish, and not trust to the simple word "pepsin," or any of the objectives applied to it by different manufacturers, for the reason that many apothecaries will take advantage of these open doors to use the cheapest pepsin they can buy, and the result to the patient will be different from what the physician had a right to expect, to his great disappointment and injury to his reputation. There is no doubt that, like all good things, the best pepsin made has been imitated, and where nothing else would serve, unscrupulous manufacturers have substituted adjectives in the appellation of their manufactures which, by the change of one letter, perhaps, or similarity of sound, were intended to convey the idea to the purchaser that it was the best and purest.

The Patent Office reports show that in October, 1883, letters patent were granted to Carl Jensen, of Philadelphia, No. 286,138, for a process of subjecting animal stomachs to the action of heat, and whereby a gastric digestion takes place,

and peptone containing the digestive or gastric ferments is produced, separating the impurities from said peptone, and then evaporating it to dryness.

This pepsin, in the form of hard scales or crystals, is transparent, odorless, tasteless, capable of being permanently preserved, freely soluble in water, without the use of acids, free from inert additions, and having a digestive power of one to seven hundred. The other patent, No. 327,567, for a "peptone pepsin," was granted to Morris B. Manwaring, Bayonne, N. J., October 6th, 1885, the method of producing peptone pepsin by the action of a solution of pepsin on an acidulated mixture of coagulated egg albumen with water, whereby a peptone pepsin is produced which is thereafter reduced to scale form by evaporation, this improved peptone pepsin consisting of a composition in scale form of pepsin with peptonized egg albumen.

It will thus be seen from these claims that while the former of these patents is for a pepsin free from all inert additions, the latter is for a mixture of pepsin and albumen. Further light was thrown upon this when at a hearing of one of the patent suits the owners of the latter patent, the New York and Chicago Chemical Company, under oath admitted that they used sixty pounds of egg albumen to every two hundred stomachs. As it is well known that this number of stomachs yields only about three pounds of pepsin, it proves that every sixty-three pounds of the "peptone-pepsin" made under the latter process cannot possibly contain more than three pounds of pepsin, or a strength of one part pepsin to twenty-one parts of inert addition, or, what is worse than inert additions, that uses up a portion of the peptonizing power of the small proportion of pepsin it really contained before the admixture was made.

Much has been said as to the originality and priority of these inventions. That is a matter which we as journalists or our readers do not care anything about, all we have to do with being the question as to which is the best and cheapest to use. No one will deny that a pepsin of full strength is cheaper at even three times the price than one of only the strength of one in twenty-one.

The largest wholesale drug house in the world, that of Gehe

& Co., in Dresden, Germany, have placed the weight of their influence on the side of Jensen's by buying his product to the exclusion of every other.

The courts thus far have decided in the same direction, but a practical test will still further decide the matter. The same writer we have quoted before has made a partial test by the methods he has indicated. We quote his results without giving names before giving the results of the tests made in our laboratory.

"It may be interesting in this connection to give a few of the results obtained by this process with some of the pepsins of the market.

"A so-called 'Turkey pepsin' leads the list. That is, it was found to be absolutely inert. Several samples of commercial pure pepsin were found, one grain of which would dissolve 500 to 700 grains of albumen, and one sample was found to digest 1150 grains. This is the highest result I have ever obtained from numerous careful tests.

"One of the 'scale pepsins' of the market was found to dissolve 157 grains of albumen, while another sample from the same firm dissolved 350. In fact, there are just as many degrees of strength of 'concentrated' pepsin as there are lots made, since the same conditions cannot always be met with in different membranes used.

"As regards all pepsins, I am inclined to think the manufactures of the United States are far ahead of those of Europe as regards digestive strength.

"These tests were all made in the laboratory of Eli Lilly & Co., Indianapolis."

The tests made by the *American Analyst* consisted of twelve samples of pepsin manufactured by six different firms. All of these were obtained at drug-stores, and, after being emptied into clean glass bottles, were numbered from 1 to 12, and handed to two different chemists without any knowledge on their part as to the maker of any of the samples submitted. Their reports are as follows:

Number of grains of egg albumen in finely pulverized form dissolved by two grains of pepsin in six hours at a temperature of 100–103° F.:

Sample No.	1	18 grains.
" "	2	19.7 "
" "	3	inert.
" "	4	"
" "	5	508 grains.
" "	6	506 "
" "	7	2018 "
" "	8	2007 "
" "	9	174 "
" "	10	336 "

It is fair to add that specimens Nos. 7 and 8 were Carl Jensen's crystal pepsin.

With these statements we leave the matter to be judged by the reader.—*American Analyst.*

RUSH MONUMENT COMMITTEE.

To the Members of the Profession of Medicine in the United States:

At the meeting of the American Medical Association at Washington in 1884, it was remarked that while that beautiful city was adorned with statues of patriots who have aided to establish the American nation and in themselves have made the name American honorable among men, there was no representative of the profession of medicine among those who had been thus commemorated.

Congress is placing in the Memorial Hall of the Capitol the statues of the founders and men of mark of the Republic, each State contributing those of two of its most eminent *citizens*, and the collection already includes the Winthrops, Samuel Adams, Hamilton, Livingston, Clinton, Roger Williams, Nathaniel Greene, Collamer, Fulton, Roger Sherman, Trumbull, Baker, William King, Muhlenberg, and Ethan Allen.

Of the Presidents, Washington, Jefferson, Jackson, Lincoln, and Garfield have already, and Grant and Taylor are soon to have, their effigies in stone or bronze. The military and naval

heroes of the country have been honored in the persons of Scott, Thomas, McPherson, Rawlins, Greene, Farragut, and Du Pont, and to these McClellan, Hancock, Shields, McDonough, and Barry are about to be added. A resolution is pending to erect a statue to Stanton as Secretary of War. The law has its representative in Chief-Justice Marshall, and science is recognized in Professor Henry. The Church is to have its statue to Wesley; the deaf mutes have taken action toward a memorial of their eminent teacher, Gallaudet; and philanthropy is to have a monument to Peabody.

Other monumental adornments of the national capital are the Emancipation Statue in Lincoln Park; the Naval Peace Monument at the foot of the Capitol; the statues of the world's great artists, among them the American Crawford, surrounding the Corcoran Art Gallery; and the statue of Martin Luther overlooking Thomas Circle. Congress is further providing for heroic statues of Columbus, Penn, Lafayette, and Anthony Wayne; and the Italians are contributing for one to Garibaldi.

Painters and sculptors, presidents and law-makers, generals and admirals, the scientist and the discoverer, the philanthropist and the teacher, the jurist and the divine, thus all appropriately commemorated, the profession of medicine ought not to delay longer in erecting its enduring testimonial of one who was not only a great physician, teacher, and investigator in medicine, a philosopher, philanthropist, eloquent lecturer, and accomplished writer, but also a fearless patriot and founder of the Republic, a member of the Continental Congress and signer of the Declaration of Independence, the first Surgeon-General of the Army of the Revolution for the Middle Department and Physician-General of Military Hospitals, and a member of the Convention for the adoption of that Federal Constitution under which we now happily live,

BENJAMIN RUSH, OF PENNSYLVANIA,

whose active, honorable life was crowned by his heroic death on the 19th of April, 1813, in the sixty-eighth year of his age, when, while trying to save other lives, he fell like a soldier on the battle-field, a victim of the prevailing epidemic of typhus.

Seventy years ago it was written of him: "Considered in

relation to the entire composition of his character—as a practitioner, a teacher, a philosopher, and a writer—Dr. Rush must be acknowledged to have been the most distinguished physician that America has produced ;" and a later author has said : "The loss of no individual of this country, excepting Washington and Franklin, has been lamented with more universal and pathetic demonstrations of sorrow. As a physician, he has left upon the age in which he lived the impress of his character and genius ; in the minds of his countrymen he holds an undisputed pre-eminence ; and among foreign nations it is acknowledged that the fame of Sydenham has been rivalled by that of Rush."

The committee to whom has been intrusted the execution of this great work are happy to state that it has met with unqualified approbation from every part of the country, and they accordingly announce that they are now ready to receive subscriptions and donations.

The existing statues in Washington have ranged in price from $15,000 to $50,000—that of Professor Henry having cost $15,000, and that of Chief-Justice Marshall $40,000, both civic statues by Story. If may be approximately estimated that $40,000 will be sufficient to erect a monument that will be fitting and unexceptionable as a work of art, and it does not admit of question that this sum can be speedily raised among the 106,000 physicians and students of medicine in the United States. That no one may be debarred the privilege of contributing, a subscription rate of one dollar from each individual has been determined, and you are accordingly solicited to remit that amount to the member of the committee representing the State, Territory, or national service to which you belong, who will also receive voluntary donations of such other sums as may be tendered by persons interested in this national undertaking.

For the Committee,

ALBERT L. GIHON, M.D., Chairman.
GEORGE H. ROHÉ, M.D., Secretary.
JOSEPH M. TONER, M.D., Treasurer.

Members of Rush Monument Committee authorized to solicit and receive subscriptions :

Alabama, R. F. Michel, M.D., Montgomery; Arkansas, R. G. Jennings, M.D., Little Rock; California, G. G. Tyrrell, M.D., Sacramento; Colorado, Charles Denison, M.D., Denver; Connecticut, G. W. Russell, M.D., Hartford; Dakota, W. E. Fraser, M.D., Bismarck; Delaware, L. P. Bush, M.D., Wilmington; District of Columbia, J. M. Toner, M.D., Washington; Florida, T. O. Somers, M.D., Jacksonville; Georgia, J. A. Gray, M.D., Atlanta; Illinois, S. J. Jones, M.D., Chicago; Indiana, J. H. Davisson, M.D., Warsaw; Indian Territory, M. K. Taylor, M.D., Fort Sill; Iowa, J. F. Kennedy, M.D., Des Moines; Kansas, F. D. Morse, M.D., Lawrence; Kentucky, Steele Bailey, M.D., Stanford; Louisiana, P. B. McCutcheon, M.D., New Orleans; Maine, S. C. Gordon, M.D., Portland; Maryland, G. H. Rohé, M.D., Baltimore; Massachusetts, E. H. Brigham, M.D., Boston; Michigan, G. E. Ranney, M.D., Lansing; Minnesota, J. H. Murphy, M.D., St. Paul; Mississippi, W. F. Hyer, M.D., Holly Springs; Missouri, George Homan, M.D., St. Louis; Nebraska, A. S. von Mansfelde, M.D., Ashland; Nevada, ; New Hampshire, G. P. Conn, M.D., Concord; New Jersey, William Elmer, M.D., Trenton; New Mexico, W. R. Tipton, M.D., Las Vegas; New York, A. N. Bell, M.D., New York City; North Carolina, W. C. Murphy, M.D., South Washington; Ohio, G. A. Collamore, M.D., Toledo; Oregon, E. P. Fraser, M.D., Portland; Pennsylvania, J. H. Musser, M.D., Philadelphia; Rhode Island, H. R. Storer, M.D., Newport; South Carolina, R. A. Kinloch, M.D., Charleston; Tennessee, C. C. Fite, M.D., Knoxville; Texas, F. E. Daniel, M.D., Austin; Vermont, E. F. Upham, M.D., West Randolph; Virginia, G. B. McCorkle, M.D., Covington; Washington Territory, T. T. Minor, M.D., Seattle; West Virginia, S. L. Jepson, M.D., Wheeling; Wisconsin, J. T. Reeve, M.D., Appleton; United States Army, Charles Smart, M.D., Washington, D. C.; United States Navy, J. C. Spear, M.D., Brooklyn, N. Y.; United States Marine Hospital Service, P. H. Bailhache, M.D., Philadelphia, Pa.

EDITOR'S TABLE.

REVIEW OF STATE BOARDS OF HEALTH REPORTS; MORTALITY AND MORBILITY STATISTICS.

ALABAMA.—The Report of the State Board of Health of this State is an essential part of the transactions of the State Medical Association which comprehends it. In the report for 1885 the State is shown to have been entirely free from the more destructive epidemics, such as yellow-fever, cholera, and small-pox, while there was a considerable prevalence of milder infectious diseases—measles, rötheln, and whooping-cough, but with little fatality. Considerable progress has been made in the difficult work of securing the registration of vital statistics, insomuch that the returns of births and deaths in several counties now approximate completeness. Progress has necessarily been slow, because the annual appropriation of $3000 only for the support of the work could not make it otherwise; but the prospect is encouraging for the future, notwithstanding an effort at the last session of the General Assembly, supported by a few members of the Medical Association, to repeal the enactment for its support. Fifty county Boards of Health are now organized and engaged in practical work. The laws and ordinances requiring reports and registrations of births and deaths appear to be complete, and the system of supervision exercised by the State Health Officer is such as to fully justify the confidence expressed by the Medical Association as follows:

"*Resolved*, by the Medical Association of the State of Alabama, acting as the State Board of Health, and in the name and behalf of the fifty-five county Boards of Health now organized in the State, and of the nearly one thousand physicians who constitute our membership: (1) That we have seen with great regret the efforts that were made in the last session of the General Assembly to repeal the appropriation of three

thousand dollars, which alone enables us to carry into effect the health laws of the State; (2) That we earnestly believe that no equal amount of money paid out of the State treasury is more wisely, or more usefully, or more beneficently expended than is this appropriation of three thousand dollars; (3) That if any further efforts to repeal this appropriation shall be made at the approaching session of the General Assembly, we hereby pledge ourselves to stand by the existing health laws, and to use our influence both as an organization and as individuals to prevent their repeal."

CALIFORNIA.—Ninth Biennial Report of the State Board of Health for the fiscal years from June 30th, 1884, to June 30th, 1886, pp. 282. This report very properly opens by an urgent appeal to the legislature for the needful appropriation to properly establish and equip a quarantine at some point on the Bay of San Francisco, and for compulsory vaccination laws, at least so far as regards school children, as subjects of primary importance for the protection of the public health of the State. Laws and means are also urged for an analysis of the mineral waters, and for the speedy organization of efficient local Boards of Health throughout the State. Of 60 incorporated cities and towns, 19 only are reported as having organized Boards of Health, and three additional as having health officers, notwithstanding the Political Code of the State makes it "the *duty* of the Boards of Trustees, Council, or other corresponding board of every incorporated town and city in the State to establish by ordinance a Board of Health for such town or city." But there is no penalty, and hence the neglect. To remedy this criminal neglect, increased authority to the State Board of Health is very properly urged by the secretary, to render the law practicable. The registration law is also reported to be very incomplete, and the results consequently unsatisfactory; in short, the people are evidently not alive to the importance of public sanitation and the value of vital statistics to the safety and well-being of the State; and their appointed agents, the legislators, have evidently not only failed to profit by the vigorous, though for the most part voluntary, work of this State Board of Health—one of the oldest—but they are obtuse to contemporary work by other State Boards.

Under the head of Mortuary Statistics, the secretary gives a condensed statement of what our readers are already familiar with through the abstracts from reports kindly sent us monthly; but, under "Review of 1885 and 1886," the secretary sums up the deaths from some prevailing causes, "occurring among a little over one half the population," from which he deduces the conclusion that the death rate of the entire State is about 18 per 1000. "The past year was not marked by any epidemic disease within the State," yet there were "no less than 332 recorded victims to unsanitary surroundings" by *diphtheria*, out of a total of 374 reported from this cause. "If we add to these those not recorded, but which undoubtedly took place, we are startled at the mortality caused by this preventable disease." Of 604 deaths from *pneumonia*—6.2 per cent of the total number of deaths from all causes—it is safe to say that at the least one half of them were due to causes similar to those which fostered diphtheria, and equally preventable. Two hundred and fifty deaths are ascribed to *typhoid-fever* (and it is well to bear in mind that only about half are reported), well known to be preventable by all intelligent people; and from *consumption* "three times more deaths than from any other disease," in a climate, for the most part, which, if divested of local unsanitary conditions, would be one of the most propitious on the continent for the prevention of this disease. It seems to us impossible to conceive of a legislative body so careless of the health of the people, or so purblind to the plainest dictates of common knowledge, as to longer neglect such additions to the health laws of the State as this report recommends.

For the month of September reports from 68 cities and towns, comprising a population of 560,750: deaths, 745; consumption, 119; acute respiratory diseases, 35; diphtheria and croup, 27; typhoid-fever, 23; cerebro-spinal-fever, 8. Death rate, 15.9.

San Francisco: Population, 280,000; deaths, 394; consumption, 51; acute respiratory diseases, 23; diphtheria and croup, 17; typhoid-fever, 13. Death rate, 13.3.

DELAWARE, for the month of September (no State Board report).—*Wilmington:* Population, white, 47,800; colored,

8000—55,800. Deaths, 55; of zymotic diseases, 9; of consumption, 13. Death rates: white, 11.29; colored, 15—11.83.

ILLINOIS.—The State Board of Health has issued a complete summary of its several reports hitherto on Medical Education and Medical Colleges in the United States and Canada, 1765–1886, based upon their own statements concerning requirements, curricula of study, duration and number of lecture courses, and other data upon which to have a definition of the phrase "good standing," as used to regulate the practice of medicine in Illinois. It contains a large amount of useful information on the subject for standard reference.

Chicago, for the month of September: Population, 704,000; deaths, 1145; under five years of age, 595; of zymotic diseases, 375; of consumption, 85. Death rate, 19.50.

LOUISIANA.—For September, no State Board report. *New Orleans:* Population, white, 173,500; colored, 64,500—238,000; deaths, white, 292; colored, 152—444. Of zymotic diseases, white, 34; colored, 19—53; of consumption, white, 33; colored, 23—56. Death rates: white, 20.19; colored, 28.27—22.38.

MARYLAND.—Sixth Biennial Report of the State Board of Health, 1886, pp. 233. Fifty pages of this report are taken up with a summary of much excellent work, chiefly of preventive measures by the abatement of nuisances, unhealthful conditions of occupations, public schools, and other public buildings, slaughter-houses, piggeries, etc.; the promotion of soil drainage, the use of disinfectants, special precautions against the introduction of small-pox, cholera, and other infectious diseases. The remainder consists of the addresses, papers, and discussions before the Second Sanitary Council of Maryland, September 17th–19th, 1884, on "Malaria and Soil Pollution," address by the late Professor Richard McSherry, President of the Board; the "Importance of Constant Supervision and Inspection of Public Institutions," address by Hon. John Lee Carroll, President of the Convention; the "Importance of Sanitary Knowledge," letter of ex-Governor Whyte; "Diphtheria, its Sanitary, Preventive, and Local Treatment," by Jackson Piper, M.D.; "Dangers in Food," by Professor George H. Rohé, M.D.; "Disposal of the Dead," by John

Morris, M.D.; "Typhoid-Fever at Elkton," by C. W. Chancellor, M.D., Secretary of the Board; "Diseases of Domestic Animals," by Dr. Robert Ward, F.R.C.V.S.; "Causes of Cholera," by James A. Steuart, M.D., Health Commissioner of Baltimore; "Quackery and Patent Medicines," by Dr. Edward M. Schaeffer; "Relation of the Medical Profession to Sanitary Work," by Professor A. B. Arnold, M.D.; "Relations of the Press to Sanitary Work," by James R. Brewer; "Relations of Pharmacy to Sanitary Science," by J. F. Hancock, Ph.D.; the "Importance of State Medicine," address by Hon. John L. Thomas; "Origin and Propagation of Asiatic Cholera," by C. H. Ohr, M.D.; "Cremation," by St. George W. Teakle, M.D., Member of the Board; the "Plumber and Sanitation," by James Miller, plumber; "Irrigation as a Process for Purifying Sewage," by George E. Waring, Jr., M.I.C.E.; "Sewage Disposal—a Rejoinder to Colonel George E. Waring," by C. W. Chancellor, M.D., Secretary of the State Board; "Drainage of Marsh Lands, and the Squalid Dwellings of the Poor," by C. W. Chancellor, M.D., Secretary of the Board. The papers of Colonel Waring and Dr. Chancellor on "Sewage Disposal by Irrigation" are of special interest by reason of the thoroughness with which they comprehend the subject from the different aspects of the two observers, and the importance of the evidence adduced in favor of and against special systems advocated. The interested reader, however, will find it necessary to seek the *true* issue further back, the present paper of Colonel Waring being an evident device to divert attention from some important truths which Dr. Chancellor had been the means of bringing to light on the *flush tank* system, commonly known as the "Waring System," as compared with the Liernur system. (See THE SANITARIAN, Vol. XII., p. 145.) The report altogether is of much interest and great practical utility.

Baltimore, for four weeks ending September 25th: Population, white, 355,770; colored, 61,450—417,220; deaths, 585; under five years of age, 278; of typhoid- and typho-malarial-fevers, 35; consumption, 74. Death rate: white, 16.2; colored, 27.9—18.2.

MASSACHUSETTS.—Seventh Annual Report of the State

Board of Health, Lunacy, and Charity of Massachusetts; Supplement containing the Report of Papers on Public Health. This report embraces the following topics: "Malaria in Eastern Massachusetts," by Dr. Z. B. Adams; "Weekly Mortality Reports of Cities and Towns for 1885;" "Report upon Food and Drug Inspection;" "Disposal of Sewage at Massachusetts Reformatory," by William Wheeler, C.E.; "Case of Lead-Poisoning," by Dr. F. W. Jones; "Report of Water Boards and Companies, and General Index of Health Supplements, and Chapters on Public Health in Annual Reports." These subjects are summarized prefatorily under the head of "General Report."

Dr. Adams's report is a continuation of his previous investigations on the same subject, in the Second Annual Report of the Board, 1880. It is illustrated by a map showing the extent and local conditions where malarial disease has prevailed, while he contends that heat, moisture, and vegetable decay hold, at the most, very uncertain relations in regard to it, if, indeed, any at all, inasmuch as they frequently exist and for long periods of time without seeming to have the influence commonly attributed to them; while, on the other hand, malarial disease frequently occurs in places apparently exempt from such factors, or subsequent to their extermination.

The weekly mortality reports comprise the statistics of about 1,322,000 inhabitants; number of deaths reported, 24,524—18.55 per 1000. Deaths under five years of age, 8250—33.7 per cent of the total. Thirty-five hundred and fifty-five died of *consumption:* 2.69 per 1000 of population, or 14.04 of the total number of deaths from all causes. No serious epidemics prevailed during the year, and the reports show a slight diminution in fatality from all the reported infectious diseases except measles, acute lung diseases, and small-pox.

From *acute lung diseases* the number of deaths was 3063—2.31 per 1000 of population. From *typhoid-fever*, 390 deaths, 15.9 per 1000 from all causes, and much less than that of any previous year. From *diphtheria* and *croup*, 1054, 43 per 1000 of all reported deaths—2.3 less than for the previous year, and less than the average of the ten previous years. From *measles*, 139—5.67 per 1000 from all causes. Of *small-pox* there were 32 cases and 11 deaths, in 12 cities and towns,

"mainly among the unvaccinated French-Canadian population, who were in more or less direct communication with the British provinces. Contrary to the experience of former epidemics, no cases occurred in towns where large paper manufactories, employing rags, were located."

The inspection of food and drugs has continued systematically, as detailed in previous reports, and with the most satisfactory results. "Especially is this true with reference to the inspection of milk." The knowledge that the Health Department exercises a constant watchfulness over the milk supply has had the effect of a marked improvement upon the quality of this most important article of food in the cities and large towns of the State.

Of 89 samples of "Butter" examined, 32 were found to be adulterated; 5 were sold as oleomargarine, but not so marked; one as "pure," but wrapper marked "butterine." Fifty specimens of Baking Powder, representing 34 different brands, were examined. Thirty-five were found to contain alum—*beware of them;* their names are: "Silver Star," "Ne Plus Ultra," "Eureka," "Enterprise," "Sovreign," "A. and P.," "State," "Old Colony," "Silver King," "Davis," "Welcome," "Henkel," "Centennial," "International," "Gem," "Can't be Beat," "Crystal," "Fleur-de-Lis," "Featherweight," "Puritan," "Windsor," "Albany Favorite."

Twenty-two samples of package "Coffees," excepting two or three, contained no coffee at all—consisted mainly of roasted peas, rye, or wheat, with or without chiccory.

Of 12 samples of "Maple Sugar," 7 only were genuine. The other 5 were compounds of glucose and molasses.

Of 37 samples of "Honey," 19 were genuine; the rest were adulterated with glucose and common sirup.

Of "Jellies and Jams," 3 samples of genuine and 29 adulterated were examined; in no case did the flavor of the latter suggest the fruit they pretended to represent.

Disposal of sewage at the Massachusetts Reformatory, with diagrams, is a good illustration of successful disposal by irrigation on a small scale, which similar institutions elsewhere would do well to profit by. The "Reports of Water Boards and Water Companies" are in accordance with the requirements of the Board, but contain nothing of special interest.

MICHIGAN.—Thirteenth Annual Report of the Secretary of the State Board of Health for the fiscal year ending September 30th, 1885, pp. 332. This volume is arranged in two parts. The first contains the secretary's report of the work of the Board, property, library, etc.; and the second, papers, abstracts, and reports on special subjects—about half of the volume—to which are added proceedings of the sanitary conventions held at East Saginaw, December, 1884; Lansing, March, 1885, and Ypsilanti, June, 1885. Our abstracts of the secretary's reports monthly, and of the proceedings of the sanitary conventions under the auspices of this Board, have generally been so full as to render an extended notice of this excellent volume unnecessary. Under the head of "Communicable Diseases in Michigan during the Year ending December 31st, 1885," by the secretary, the summary is as follows: *Diphtheria*, 467 outbreaks in 396 localities; 4018 cases, 964 deaths. Seventy health officers and clerks reported that they could not find the source of the contagium; 24, that it was sporadic. But there was a general consensus of opinion that the disease was contagious. *Scarlet-fever*, 356 outbreaks in 337 localities; 2750 cases, 187 deaths. Of 187 reporters, 113 reported in substance that the source of the disease was unknown; 74, that it was traceable in various degrees of certainty to contagium. *Small-pox*, 9 outbreaks in the same number of localities; 27 cases, 6 deaths. *Glanders* was reported in 5 localities, in one of which there was one death of a human being. *Typhoid-fever*, 218 outbreaks in 200 localities; 715 cases, 194 deaths. Three fifths of all the outbreaks occurred during the five months July–November. Forty-nine observers reported the source unknown; 9, that the disease was sporadic or local; 23 attributed the source to "impure water;" other reporters to "low water in the well," "impure water from the well, being largely surface-water," "impure water, well near drains and privy vaults," etc. *Measles*, 48 outbreaks; 673 cases, 70 localities, 23 deaths. Sixteen health officers and clerks reported source of the contagium unknown; 10, that it had been introduced from some other locality; 4, that the disease had been taken at school; others that it was "epidemic," "sporadic," and "contagious." Of the 48 outbreaks, 25 began during the months April to June

inclusive. *Whooping-cough*, 2686 cases in 143 localities, 65 deaths.

Prompt action in dealing with the first and recurring cases, with a view to the earliest possible extermination of all such diseases, appears to be general throughout the State.

For the month of October, 1886, compared with the preceding month, the reports indicate that diphtheria, bronchitis, and scarlet-fever increased, and that diarrhœa, dysentery, cholera morbus, cholera infantum, decreased in prevalence.

Compared with the preceding month, the temperature in the month of October, 1886, was considerably lower, the absolute and the relative humidity and the day and night ozone were less.

Compared with the average for the month of October in the eight years 1879–86, cholera infantum was more prevalent, and intermittent-fever, remittent-fever, typho-malarial-fever, pneumonia, consumption of lungs, and bronchitis were less prevalent in October, 1886.

For the month of October, 1886, compared with the average of corresponding months for the eight years 1879–1886, the temperature was about the same, the absolute humidity was slightly lower, the relative humidity was the same, and the day and the night ozone were more.

Including reports by regular observers and others, diphtheria was reported present in Michigan in the month of October, 1886, at 63 places, scarlet-fever at 38 places, typhoid-fever at 43 places, measles at 6 places, and small-pox at 1 place.

Reports from all sources show diphtheria reported at 6 places less, scarlet-fever at 8 places more, typhoid-fever at 7 places less, measles at 5 places less, and small-pox at 2 places less in the month of October, 1886, than in the preceding month.

Detroit, for the month of September: Population, 175,000 (18,000 added by recent addition); deaths, exclusive of still-births, 325; under five years of age, 84; of zymotic diseases 109; of consumption, 24. Death rate, 22.59.

MINNESOTA.—For September no State Board report received. *St. Paul:* Population, 125,000; deaths, 156; under five years of age, 85; of zymotic diseases, 59; of consumption, 12. Death rate, 14.97.

MISSOURI.—For the month of September, no State Board report. *St. Louis:* Population, 400,000; deaths, 734; under five years of age, 352; of zymotic diseases, 281; of consumption, 62. Death rate, 18.7.

NEW HAMPSHIRE.—Fifth Annual Report of the State Board of Health for the fiscal year ending April 30th, 1886, pp. 336. Besides a good deal of sanitary work in general during the year, this report represents special investigation of, and energetic action against, typhoid-fever, diphtheria, scarlet-fever, small-pox, cholera, unsanitary school-houses and railway stations and grounds, and the danger of summer resorts. Reports by physicians from all parts of the State show that typhoid-fever and diphtheria are commonly due to local filthy conditions in some form, which are readily removable, and that in proportion as such conditions have been removed and prevented, these diseases have diminished. Dr. C. B. Nichols makes a specially graphic report of typhoid-fever in an unsanitary locality in Franklin, showing the relations of cesspools, wells, and privies to 18 cases of typhoid-fever, 2 of diphtheria, 3 of scarlet-fever, and 1 of erysipelas, with 4 deaths. He estimates the pecuniary cost of these cases, covering a period of three months, on figures given him by members of the families affected, at $7215—valuing the four lives lost at $1000 each. In another special report on "Unsanitary Wells," by Dr. William Child, of New Hampton, elaborating the same conditions, it appears that during the last three years there have been in this State 497 deaths from typhoid-fever and 358 from diphtheria, and probably not less than 10,000 cases of painful diseases that could have been prevented. The cost of these in actually paid accounts of physicians, nurses, and other help must have been fully $50,000, and the loss by death $1,000,000; and, as applied to the State, there is, he estimates, a yearly cost of not less than $50,000 due to sickness and death which could be prevented by proper sanitary precautions. These reports and estimates are by no means overwrought, but, on the contrary, a careful reading of the abstracts of reports by physicians throughout the State suggests that they are low estimates. Moreover, these estimates take no account of the loss to the State as well as to the family by the crimi-

nally unsanitary and death-dealing conditions of school-houses. The secretary of the Board, Dr. Irving A. Watson, reports on the "School-houses of Merrimack County." The condition of these, 176 in number, he thinks, represents a fair average for other counties. Of the whole number 77 are reported without means of ventilation. In 99 some attempt has been made to secure more or less circulation of the air, but it is doubtful if efficient means have been secured in half a dozen. Of the number reported without any means of ventilation, the average attendance would render the air unfit to breathe in periods varying from *four* minutes to one hour and a half. In regard to light, no attention whatever appears to have been given to the quantity or arrangement. It was found to vary from *one per cent* only of the floor area to 25; 66 out of the 176 have less than 10 per cent. Forty-seven have windows *on all sides;* 93 *on three sides;* in 66, *in front* of the pupils; 58 had neither curtains nor blinds. In 31 *near-sightedness* was reported. Of water supply: 30 reported no water supply; 66 from "neighbor's well;" 51 from "wells," not stating whether belonging to district or not; 19 from springs, and 5 from brooks. Sixteen teachers report the supply from a low source; frequent statements are made that the well is located near some nuisance that might be the means of contamination.

With regard to *privies*, "the most abominable and disgraceful condition of affairs that could well be imagined exists." *Fourteen have nothing of the kind.* In 103 districts only one privy, and that is common to both sexes. Offensive nuisances, exclusive of the privy, hog-pens, stables, swamp, etc., in 16 districts.

The report throughout is devoid of technicalities, well adapted to the comprehension of the general reader, and should be placed in every household in the State.

NEW JERSEY.—For the month of September, no State Board report. *Hudson County*—Jersey City, Hoboken, and vicinity: Population, 250,754; deaths, 477. Deaths under five years of age, 232; of zymotic diseases, 119; consumption, 58. Death rate, 23.13.

Newark: Population, 158,616; deaths, 284; under five years of age, 105; of zymotic diseases, 146. Death rate, 21.43.

Paterson: Population, ; deaths, 107; under five years of age, 43; of zymotic diseases, 39. Death rate, .

NEW YORK.—The total reported mortality of 125 cities and towns for September is 7239, of which 44.3 per cent were under the age of five years. From zymotic diseases there were 1960 deaths, a ratio of 272.88 per 1000 mortality. From diarrhœal diseases, the ratio per 1000 is 165.40; from typhoid-fever, 24.49; from croup and diphtheria, 44.78, there being a continued prevalence, to a mild degree generally, of the last reported in various parts of the State. From consumption the ratio of mortality is 127.34 per 1000, and 228.76 per 1000 deaths above the age of five years. The combined death ratio per 1000 from zymotic diseases, consumption, and puerperal diseases is 408.62. From acute respiratory diseases there were 67.26 deaths per 1000. For the preceding month, 215 delayed returns, of which 60 are under the age of five years, have been received. No returns are received from the cities of Cohoes and Watertown. The town of New Lots has become a part of the city of Brooklyn.

New York: Population, 1,439,000; deaths, 2767; under five years of age, 1317; of zymotic diseases, per 1000 deaths from all causes 306.45; of consumption, 374; of acute respiratory diseases, 226. Death rate, 23.10.

Brooklyn: Population, 690,000; deaths, 1310; under five years of age, 712; of zymotic diseases, per 1000 deaths from all causes, 279.38; of consumption, 160; of acute respiratory diseases, 109. Death rate, 22.80.

Buffalo: Population, 202,818; deaths, 370, for four weeks ending September 25th; under five years of age, 211; of zymotic diseases, per 1000 deaths from all causes, 351.35; of consumption, 32; of acute respiratory diseases, 18. Death rate, 23.12.

Rochester: Population, 101,000; deaths, 215; under five years of age, 96; of zymotic diseases, per 1000 deaths from all causes, 251.16; of consumption, 30; of acute respiratory diseases, 10. Death rate, 25.55. The *highest* death rate of any city in the State of over 10,000 population was that of *Long Island City*, 29.40. The *lowest* death rate of any city in the State of over 10,000 population was that of OGDENSBURG,

10.91. The highest death rate without regard to population was of *Gravesend and Green Island* (of 5000 population each), *each*, 36.00 per 1000.

The lowest death rate without regard to population was that of WESTFIELD, population 7000, *but one death* during the month—1.72 per 1000.

VITAL STATISTICS OF IMMIGRATION AT THE PORT OF NEW YORK FOR OCTOBER, 1886.—(2) Rugia, Hamburgh, 677 passengers, 1 death, 1 birth; (3) Leerdam, Rotterdam, 529 passengers, 1 death; (5) Trenacia, Gibraltar, 626 passengers, 1 death, 1 birth; (6) Lessing, Hamburgh, 529 passengers, 2 deaths; Wyoming, Liverpool, 636 passengers, 1 death; (7) Nebraska, Glasgow, 479 passengers, 1 death; Belgenland, Antwerp, 559 passengers, 1 birth; (9) Weeland, Hamburgh, 635 passengers, 1 birth; Richmond Hill, London, 79 passengers, 1 birth; Frare, Bremen, 1134 passengers, 1 birth; (10) Alesia, Marseilles, 1048 passengers, 3 deaths, 1 birth; (11) Servia, Liverpool, 627 passengers, 1 birth; Arizona, Liverpool, 578 passengers, 1 death; (15) Alexandria, Genoa, 352 passengers, 1 death; Cheribón, Marseilles, 705 passengers, 2 deaths; (16) Gillert, Hamburgh, 484 passengers, 1 death; Baltic, Liverpool, 639 passengers, 1 birth; (18) Celtic, Liverpool, 748 passengers, 1 death; (21) Rhein, Bremen, 380 passengers, 1 death; Gothnia, Hamburgh, 231 passengers, 1 death; (22) America, Liverpool, 522 passengers, 1 death; (24) Bretania, Liverpool, 633 passengers, 2 births; Alabama, Glasgow, 138 passengers, 1 birth; Saale, Bremen, 1068 passengers, 1 birth; (25) Edam, Amsterdam, 444 passengers, 1 death; (27) Ethiopia, Glasgow, 359 passengers, 2 deaths; Anchoria, Glasgow, 524 passengers, 2 deaths.

Total passengers, 16,153; births, 10; deaths, 27.

NORTH CAROLINA.—Bulletin of the State Board for the month of September reports from 39 counties: *Typhoid-fever* in 29 counties, 178 cases, and "considerable" not enumerated. *Diphtheria* in 15 counties, 102 cases, and also "considerable" in other counties. Pernicious *malarial-fever*, more prevalent than usual, 32 cases reported in 5 counties, but more than as many more report its prevalence without giving the number of cases. *Whooping-cough*, 118 cases in 6 counties, and "consid-

erable" in 4 others. *Measles*, 45 cases in 5 counties; *scarlet-fever*, 48 cases in 2 counties, and both of these diseases, also, prevail more or less in other counties; but the number of cases are not reported. Hog and chicken cholera in 4 or 5 counties, but not very prevalent.

Wilmington reports for the month: Population, white, 8000; colored, 12,000—20,000; deaths, white, 12; colored, 40—52. Death rates: white, 18; colored, 40—31.2.

OHIO.—By the weekly bulletin of the State Board for the month of September, the prevailing diseases reported by 79 observers in different parts of the State are *malarial-fevers*, *scarlatina*, *measles*, *typhoid-fever*, and *diphtheria*. Scarlet-fever has recently been the subject of special attention by the Board, and the secretary has issued a circular of instruction on its nature, means of prevention, restriction, and extinction, but it concludes with the remarkable statement that: "Parties desiring this circular in large quantities can get it at cost on application to the Secretary of the State Board of Health. Price, 100 copies, 50 cents; 500, $2.50; 1000, $5."

Surely there has been some oversight of the purpose of the State Board in making this condition. The circular should be placed in every household of the State at the *expense of the State*, through the State Board of Health.

Cincinnati: Population, 325,000; deaths, 504; under five years of age, 219; from zymotic diseases, 146; consumption, 65. Death rate, 18.60.

Toledo: Population, ; deaths (exclusive of 13 still-born), 89; under five years of age, 39; of zymotic diseases, 29; of consumption, 9. Death rate, .

PENNSYLVANIA.—First Annual Report of the State Board of Health and Vital Statistics, December, 1885, pp. 561, with numerous maps and diagrams. First organized July 2d, 1885, one month only subsequent to the governor's approval of the act creating it, the State Board of Health of Pennsylvania has shown thorough ripeness for its work, and made such progress in public sanitation in the comparatively short period of six months (here reported upon), as will surely not fail to win for it the cordial support of the State government and people, which it richly merits. It opens with the Act creating the

State Board of Health, followed by the minutes of meetings and the special report of the secretary and executive officer. Appended: (A) "Reports of the Several Committees—Executive;" "On Water Supply, Sewerage, Topography, and Mines;" "Public Institutions and Places, and School Hygiene;" "Sanitary Legislation, Rules, and Regulations;" address by Dr. Benjamin Lee, Secretary, on "The Proper Organization of Local Boards of Health." These reports cover a large field of initiatory work. The Committee on Water Supply, etc., "On the Pollution of Rivers," is particularly comprehensive with regard to the contamination of the Schuylkill, by the Civil Engineers Dana C. Barber and Rudolph Herring, and will doubtless receive deserved attention by the authorities. (B) "On the Sanitary Condition of Cities and Towns," comprehends the "Sanitary Condition of Harrisburg," by Dr. Hugh Hamilton; the "Sanitary Condition of Towanda," by Dr. E. D. Payne; the "Sanitary Condition of Millerstown," by Dr. S. D. Bell; "Record of Causes of Death in Philadelphia, from January, 1884, to January, 1885," by the secretary, Dr. Lee, and "Report of the Health Officers of Erie." These reports are all made with particularity in regard to the sources of preventable diseases, and illustrate points of great practical importance to the people of the several localities represented. (C) "Reports on Epidemics and Special Sources of Disease," comprehend the "Sanitary Condition of the House and Neighborhood in Philadelphia," whence probably originated the "Plymouth Epidemic;" "History of the Epidemic of Typhoid-fever at Plymouth in 1885," by Dr. Lewis H. Taylor; "Financial Cost of the Epidemic of Typhoid-Fever at Plymouth," by Dr. Morris S. French; "Report on Small-pox at Spring Mills," by the Secretary; "Report on Typhoid-fever at West Fernwood," by the Secretary; "Report on Texan Splenic-fever among Cattle in and near the City of Erie," by Dr. J. Bryce, State Veterinarian; "Report on Small-pox at Sugar Notch," by Dr. J. J. Smythe; "Report on Typhoid-fever at Sugar Notch," by Drs. Taylor and Davis. The titles of these papers fully suggest their purview and importance. The "Report on Small-pox at Spring Mill" is particularly important, because of the disease being so certainly traced to the

dusting-room in Hamilton's paper mill. (D) "Reports of Inspections:" "Of Nuisances Existing Outside the Limits of Allegheny City, and on the Pollution of the Allegheny River, and of Camp Muhlenberg," by the Secretary; of Camp Gallagher, by the President of the Board, Edward William Germer, M.D. (E) "Reports of Quarantine and Disinfection;" "Lake Quarantine at Erie;" "Municipal Disinfecting Station and System of Philadelphia." (F) "Circulars and Forms," regulating slaughter-houses, bone-boiling establishments, precautions against small-pox and cholera, forms of complaint of nuisances, etc., sanitary regulations of travel and traffic, and rules of the Philadelphia Board of Health.

Philadelphia, for four weeks ending October 2d: Population, 971,363; deaths, 1407; under five years of age, 1138; of typhoid-fever, 68; of consumption, 177. Death rate, 18.7.

Pittsburg, for four weeks ending September 25th: Population, 200,000; deaths, 264; under five years of age, 165; of consumption, 18. Death rate, 19.5.

Erie, for month of September: Population, 33,215; deaths, 33; under five years of age, 11. Death rate, 11.9.

RHODE ISLAND.—Eighth Annual Report of the State Board of Health for the year ending December 31st, 1885, including the report upon births, marriages, and deaths, in 1884, is a volume of 173 pages. The common zymotic diseases, with the consideration of which the report opens, appear to have been considerably less prevalent than for the two years last preceding, though "of frequent occurrence in a mild form in a considerable number of towns, and in a few towns in large numbers and in a more virulent form," *croup* and *diphtherial*, particularly in East Providence and Bristol, to an extent (in Bristol) "almost reaching epidemic virulence." *Malarial* diseases prevailed extensively in a considerable number of towns, but with less severity than in preceding years; but of these Newport County continues to be almost entirely exempt. *Typhoid* and other fevers not malarial were also less prevalent than usual. In New Shoreham there were a larger proportion of cases than elsewhere, but small as compared with previous years. In Providence the number of cases was estimated at not above 60 per cent of that of 1884. *Measles* prevailed epidemically in Coventry, Burrillville, Tiverton, and Little

Compton. "In 16 other towns there was prevalence to a greater or less extent, but not numerous in any, and in the remaining towns no cases were reported." *Scarlatina* was epidemic in one town only—Westerly. The epidemic began in November, 1884, and reached its greatest prevalence in January and February, after which there was abatement, but continued during the larger part of the year. *Whooping-cough* was epidemic in Burrillville, Gloucester, and less severely in Coventry, East Providence, Little Compton, and North Smithfield. The number of cases and deaths is not given except in Providence, from which city the medical inspector reported, in relation to contagious diseases:

"Whole number reported to Superintendent of Health...387
Number of premises inspected.....321
Extra number of cases on same premises.....66

". . . The number of children who have been excluded from schools, both public and private, on account of contagious diseases, having scarlet-fever, 92; having diphtheria, 33—125; scholars living in same house with these diseases, 210. Total number excluded, 335."

Under the head of "Health of Towns," data of much interest are given of the sewerage and subsoil drainage of Newport and Pawtucket, worthy of the attention of the town authorities in many other places.

"Statistics of Consumption in Rhode Island" is the subject of a special paper of much interest, an abstract of which has already appeared in our pages (Vol. XVI., p. 254).

The "Cattle Commission" report shows a continued comparatively healthy condition of the domestic animals of the State through the year. *Hog cholera* prevailed to some extent in a few localities, and a few cases of *pink-eye* among horses in one locality. Forty-four horses were reported as suspected of having *glanders* or *farcy*, of which 16 were killed for confirmed disease; 7 of these were in Providence, 2 in Pawtucket, 2 in Newport, and 1 each in Pawtuxet, East Providence, Cumberland, Warwick, and Lincoln.

"Suggestions to Health Officers," by the Secretary, is a condensed statement of the importance, duties, and practical knowledge necessary for the extermination of infectious dis-

eases, the detection of impurities and adulterations in air, water, and food, of practical utility everywhere.

The Registration Report for 1884 gives: Population, 304,900; births, 7305; marriages, 2558; divorces, 266; deaths, 5141. Average age of decedents, 33.76 years. Of the *causes of death*, there were of *zymotic diseases*, 1118, or 21.78 per cent; *constitutional*, 1119, or 21.80 per cent; *local*, 1982, or 38.48 per cent; *developmental*, 646, or 12.58 per cent; *violence and otherwise*, 276, or 5.36 per cent. Of the zymotic diseases, the chief were *diarrhœal*, 13.5 per cent; *croup* and *diphtheria*, 3.86 per cent; *typhoid-fever*, 2.45 per cent; *scarlatina*, 1.88 per cent. Of the local diseases, 7.06 per cent were *pneumonia;* 1.57 per cent *acute bronchitis*. Of the constitutional diseases, 14.34 per cent, *phthisis pulmonalis*.

The influence of season upon the mortality is tabulated for a period of thirty-one years, 1853–1883 inclusive, by which the percentage of mortality has been as follows:

January–March, 23.46; April–June, 21.02; July–September, 28.79; October–December, 26.73.

Providence, for the month of September, reports: Population, 120,000; deaths, 208; under five years of age, 79; of zymotic diseases, 78; of consumption, 24. Death rate, 20.8.

TENNESSEE.—State Board Bulletin reports for the month of September less sickness than usual. The principal diseases, named in the order of their greater prevalence, were: *Malarial-fever, dysentery, typhoid-fever, diarrhœa, pneumonia, consumption*, and *cholera infantum*.

Whooping-cough is reported in the counties of Hancock, Humphreys, Maury, Overton, Rutherford, Stewart, Williamson, and Wilson; *diphtheria* in Decatur, Jefferson, Knox, McMinn, Rutherford, and Stewart; *scarlet-fever* in Franklin, Knox, and Montgomery.

Death Rates.	Chattanooga,	white,	21.88;	colored,	50.17 : 33.00
"	"	Clarksville,	"	4.80;	"	20.00 : 10.50
"	"	Knoxville,	"	10.26;	"	10.68 : 10.36
"	"	Memphis,	"	24.16;	"	39.00 : 29.45
"	"	Nashville,	"	12.48;	"	32.19 : 19.59

Meteorological features for the month showed but little de-

parture from the means of the three previous years. Mean temperature was 70°.4. The highest temperature was 96°, recorded on the 10th. The warm wave which began about the 7th was followed close by a cool one and a fall of several degrees about the 12th—14th, and this, in turn, was succeeded by another warm wave, which culminated about the 17th, 18th, and which continued with very slight variations until the last few days of the month, when a marked depression was noted, and on the 30th the lowest temperature of the month, 38°, was recorded. The proportion of cloudiness during the month was below the normal.

The mean precipitation was 3.11 inches, a little more than half an inch less than the mean for September of last year, and about an inch more than the mean of September of the year previous.

VIRGINIA.—For the month of September, no State Board report.—*Richmond:* Population, white, 42,000; colored, 33,000—75,000; deaths: 76 white, 95 colored—171; under five years of age, white, 9; colored,—. Death rates: white, 21.7; colored, 34.5—27.3.

WISCONSIN.—For the month of September, no State Board report.—*Milwaukee:* Population, 167,000; deaths, 261; under five years of age, 81; of zymotic diseases, 82. Death rate, 18.75.

LIVES LOST ON BOARD STEAM VESSELS.—The Supervising Inspector-General of Steam Vessels, James A. Dumont, has submitted to the Secretary of the Treasury his annual report for the fiscal year ending June 30th, 1886, by which it appears 5744 steamers were inspected and 25,780 officers licensed. The receipts from inspectors were $95,470 and from licenses $12,890, while the expenditures aggregated $248,722, showing an excess of expenditures over receipts of $140,361. There were 40 accidents to vessels resulting in loss of life, during the year, made up as follows: Fire, 1; collisions, 16; explosions, 12; snags, wrecks, and sinking, 11. The lives lost number 182, of which one life was lost from fire, 34 lives from explosions or accidental escape of steam, 25 from collisions, 52 from snags, wrecks, and sinking, 62 accidental drowning, and 8 from miscellaneous causes.

Altogether, the total number of lives lost exceeded by 49

the number lost during the preceding year. Of the number of lives lost in 1886, 57 were passengers and 125 were officers or persons employed on the steamers.

MORTALITY STATISTICS ABROAD in cities containing 100,000 inhabitants and upward, during the three months ending *September* 30th, 1886, and the mortality from infectious diseases abroad, generally, at most recent dates. Of 14 large English cities, the average annual rate was 20.5. The lowest was in Bristol, 17.0, and the highest in Manchester, 24.9. Brussels, 25.4; Anvers, 24.5; Gand, 29.7; Liège, 18.8; Amsterdam, 22.7; Rotterdam, 20.8; Hague, 27.3; Paris, 22.1; Lyons, 23.1; Bordeaux, 23.7; Nantes, 23.0; Saint Étienne, 23.2; Havre, 32.6; Berlin, 31.7; Hamburg, 28.6; Breslau, 35.7; Munich, 32.9; Dresden, 29.2; Leipzig, 25.1; Cologne, 29.7; Frankfort, 19.2; Koenigsberg, 30.1; Magdeburg, 31.5; Bremen, 20.8; Düsseldorf, 28.8; Dantzig, 28.6; Nuremberg, 32.7; Stuttgart, 19.9; Strasburg, 31.2; Chemnitz, 29.5; Elberfeld, 27.2; Altona, 28.2; Barmen, 21.0; Vienna, 22.7; Buda Pesth, 39.0; Prague, 28.5; Trieste, 56.1; Copenhagen, 26.2; Stockholm, 23.1; Christiania, 24.0; St. Petersburg, 26.1; Warsaw, 28.8; Odessa, 41.9; Venice, 26.2; Bucharest, 26.3; Cairo, 51.6; Alexandria, 58.6. Three months ending *June* 30*th*, 1886: Rome, 23.6; Milan, 30.6; Turin, 25.1; Genoa, 24.8; Bologna, 22.9; Livourne, 25.4; Barcelona, 27.9; Cairo, 46.4; Alexandria, 47.6; Bombay, 27.4; Madras, 3.18.

Cholera.—During the *three months* ending *September* 30*th*, deaths reported in Buda Pesth, 169; during the *four weeks* ending *October* 23*d*, 303, the number of cases not reported. In Trieste, during the *three months* ending *September* 30*th*, 411 deaths; during the *four weeks* ending *October* 23*d*, 110. In Venice, during the *three months* ending *September* 30*th*, 132 deaths. In Bologna, during the *month of September*, 67 deaths. In Szegedin, during *three weeks* ending *October* 19*th*, 64 deaths. In Tagliari, *October* 6*th*–9*th*, 13 deaths. In Tarentum, *October* 6*th*–10*th*, 4 deaths. (Telegraphic): Buenos Ayres, *November* 19*th*, (via Galveston).—Cholera has broken out in the hospital for the insane in this city, and of 18 persons attacked 2 have died. There were 9 new cases and 5 deaths at Rosario during the past twenty-four hours.

Small-pox.—During the *three months* ending *September 30th*, deaths reported from small-pox in London, 1; Liverpool, 2; Glasgow, 1; Edinburgh, 1; Paris, 21; Bordeaux, 2; Rheims, 16; Hamburg, 4; Vienna, 16; Buda Pesth, 327; Prague, 27; St. Petersburg, 42; Warsaw, 30; Odessa, 3; Venice, 7; Bucharest, 3; Cairo, 5; Alexandria, 6; Port Said, 20. During the *month of September* in Bologna, 26. During the *month of August* in Milan, 29; Genoa, 9; Saragossa, 12. During the *month of July* in Buenos Ayres, 56.

Diphtheria and croup, during the three months ending September 30th, caused 284 deaths in London and 162 in twelve of the other large cities of England. Hull alone was exempt. In Paris, 221; Berlin, 337; Hamburg, 142; Buda Pesth, 159; Christiania, 102; Warsaw, 128; Cairo, 112. Of 116 foreign cities of 10,000 inhabitants and upward, from which reports have been received for the three months ending September 30th, 24 only, 20 of which are cities of Belgium, report no deaths from diphtheria and croup. The other 4 are Hull, Bale, Geneva, and Lausanne.

Scarlet-fever is reported for the same period rather less prevalent than diphtheria, 46 of the smaller cities reporting no deaths; but most prevalent in the same cities with diphtheria.

Measles, for the same period, appears to have been about equally exempt from deaths in the same cities as scarlet-fever.

Whooping-cough is omitted in 59 of the 126 reports, but, like the other epidemics common to childhood, prevalent more or less in all large communities.

Typhoid-fever, as always, is reported to be most prevalent in the imperfectly sewered cities. Deaths reported from it for the three months ending September 30th, in Paris, 279; Lyons, 58; Warsaw, 58; St. Petersburg, 159; Alexandria, 51; Cairo, 226. But even in these the mortality from this cause is less in proportion to population than in some American cities equally, if not, indeed, more neglectful of efficient sewerage. Philadelphia and Baltimore are prominent examples; in the former, with bad sewerage, for the same period, the mortality from typhoid-fever was 191; in the latter, without sewerage, about the same proportion to population, 57. Very few cities of much magnitude abroad, as at home, are wholly exempt from typhoid-fever, but proportionally those

are most so which are best sewered and drained. Deaths reported by 14 large English cities, comprising about 8,500,000 population, for the three months ending September 30th, was only 438—173 (4,149,533 inhabitants) in London. In Berlin, 1,315,287 inhabitants, 75. In Munich, which until recent sewerage was one of the most fruitful sources of typhoid-fever of any city in Europe, 19; Brussels, 8.

THE IMPORTATION OF RAGS INTO BOSTON.—The Boston Board of Health lately ordered that any vessel arriving at that port having on board any rags, paper stock, or other cargo or personal baggage coming from a port or place epidemically affected with any contagious or infectious disease within six months before should be anchored at Quarantine; that all old rags should be regarded with suspicion and detained by the Port Physician unless the United States Consular Officer at the port of departure had certified that they had not been gathered, or baled at, or shipped from any place infected in like manner; and that cargoes and personal baggage thought by the Port Physician or the Board of Health to be infected should be removed to the storehouse on Gallup's Island, there to be disinfected in case they could not be properly disinfected on board the vessel.

THE LOMB PRIZES.

Editor of THE SANITARIAN:

DEAR SIR: I think you should, in your valuable monthly, draw attention to the unfairness to many of the "Lomb prize" affair in connection with the American Public Health Association. In the first place, the nature of the essays *expected* was not made at all plain, the length required, etc., whether for public reading or other purpose. I saw (read) *two* of the essays, and having given much attention to the subjects too, I considered them very good indeed, well written and well worthy a prize—even *as large as offered*—involving much time and study.

A GRADUATE IN HONORS.

October 28, 1886.

Another correspondent suggests that, in view of so many fruitless efforts, the present prize committee should be dis-

charged, and the members of it thereby acquitted of their incompetency to compete, and a new committee be appointed, *not members* of the Association; letting it be understood, however, that essays hitherto rejected will be received in competition with forthcoming new essays, which this change would presumably elicit.

LITERARY NOTICES.

MEDICAL AND SURGICAL DIRECTORY OF THE UNITED STATES; comprising list of physicians and surgeons arranged by States, with school practised, post-office address, population and location, date and college of graduation, all the existing and extinct medical colleges in the United States and Canada, with locations, officers, number of professors, lectures, demonstrations, etc.; the various medical societies, medical colleges, hospitals, sanitariums, asylums, and other medical institutions; Boards of Health, synopsis of the laws of registration and other laws relating to the profession in each State; medical journals, with the names of editors, frequency of publication, and subscription rates; official list of the medical departments of the United States Army, Navy, and Marine Hospital Service; roster of examining surgeons of the United States Pension Department; descriptive sketch of each State and Territory, embodying location, boundaries, extent in miles and acres, latitude, longitude, statistics relating to climate, rate of mortality, deaths from consumption, etc.; names and locations of all the best-known mineral springs, full particulars of all national associations and societies relating to medicine and surgery, and a list of all the physicians in the United States, arranged alphabetically, with the number of the page on which the name appears. Complete in one volume, octavo, pp. 1452. Price, $5. Detroit, Mich.: R. L. Polk & Co.

The very full title-page of this useful volume, above given, leaves little more to be said about it than to state that it is the most complete source of information on the comprehensive subject of which it treats extant. To all persons who would be informed with regard to the number and whereabouts of physicians, and their status as related to medical schools,

hospitals, and other medical institutions, medical periodicals, medical and surgical appliances, etc., in short, of *everything* pertaining to the statistics of the medical profession and the institutions and occupations with which it is allied, we commend this work.

DISEASES OF THE NERVES, MUSCLES, AND SKIN, being Vol. III. of Dr. HERMANN EICHHORST'S Handbook of Practical Medicine, and Vol. X. of "Wood's Library of Standard Medical Authors," 1886 (consisting of 12 vols., price, $15). Sold only by subscription. New York: William Wood & Co.

This work is in keeping with the two preceding volumes ("Diseases of the Circulatory and Respiratory Apparatus," and "Diseases of the Digestive, Urinary, and Sexual Apparatus") by the same author, already noticed in our pages, characterized by the same conciseness of statement, while it thoroughly comprehends every point of practical importance with relation to the diseases treated of. It is thoroughly illustrated with wood-cuts, and is altogether gotten up in the good style common to the publishers.

THE PHYSICIAN'S VISITING LIST (Lindsay & Blakiston's). Thirty-sixth year, 1851–86.

This visiting list fulfils in an eminent degree the important qualities of compactness, convenience of arrangement, and strength to resist the unusual hard wear it receives, while it contains everything essential to the daily rounds of the medical practitioner—calendar, table of signs, list of poisons and antidotes, dose tables, Marshall Hall's ready method in asphyxia, lists of new remedies, Sylvester's method for producing artificial respiration, with illustrations; diagram for diagnosing diseases of the heart and lungs; explanation of the metric system; table for calculating the period of utero-gestation; disinfectants and disinfecting; examination of urine; list of standard reference books; incompatibles and a cash account. *Sizes and prices:* For 25 patients per day or week, pencil, pockets, etc., $1; for 50 patients per day or week, pencil, pockets, etc., $1.25; for 75 patients per day or week, pencil, pockets, etc., $1.50; for 100 patients per day or week, pencil, pockets, etc., $2. P. Blakiston, Son & Co., 1012 Walnut Street, Philadelphia.

TRANSACTIONS OF THE MEDICAL ASSOCIATION OF THE STATE OF ALABAMA—THE STATE BOARD OF HEALTH. Session of 1886. Pp. 360. This is a volume of unusual excellence aside from that portion specially pertaining to the State health service (reviewed on another page), comprehending addresses, papers, reports, and discussions of importance and interest to medical practitioners in every sphere of professional work. "The Annual Message of the President"—Francis Marion Peterson, M.D., of Greensboro—especially, concisely stating, as it does, the merits of "Examining Boards," "Vital Statistics," "Education in Alabama," "The Medical College of Alabama," "Medicine as a Science," "The Medical Profession," "Intemperance," and "Religion," may be read with edification and profit by people in every avocation, and is eminently worthy of separate publication and extensive circulation. The shorter addresses of the vice-presidents, Drs. L. E. Starr and R. M. Fletcher; "The Omnibus Discussion," "Supplementary Reports," "Medical and Sanitary Dissertations and Reports," evince an amount of general interest in and special devotion to professional work and progress which other State medical associations and societies may well profit by.

TRANSACTIONS OF THE LOUISIANA STATE MEDICAL SOCIETY, Eighth Annual Session, April 14th–16th, 1886. Pp. 306. The address of the President, Samuel Logan, M.D., is an urgent appeal to the "Importance of a Better Organization in the Ranks of the Medical Profession" in the State, and refers to the organization and influence of the Medical Association of Alabama as an eminently worthy example. The leading papers following are: "Observations on the Nature and Etiology of so-called Typho-Malarial-Fever," by Thomas Herbert, M.D.; "Iliac Phlegmous," by Rudolph Matas, M.D.; "Malarial Hæmaturia," by R. H. Day, M.D.; "Two Cases of Extra Uterine Pregnancy," by Thomas J. Woolf, M.D.; "Observations and Practical Results of Medical Service in the Charity Hospital of New Orleans, 1869–86," by Joseph Jones, M.D.; "Malarial Pneumonia" and "Report of Cases of Traumatic Tetanus," by D. R. Fox, M.D.; "Case of Pyo-Pneum-Thorax," by A. McShane, M.D.; "Ozone:

Considered in its Probable Relation to Public Health," by I. H. Stathem, M.D.; "Preventable Treatment of Fevers." by R. W. Seay, M.D., and "Care of the Teeth," by A. G. Friedrichs, M.D. Appended: Constitution and by-laws of the society, list of members, and table of the local medical societies in the State.

MEMORIAL WREATH FOR THE PROSECUTION IN THE GRAVES MALPRACTICE SUIT, by LEVI C. LANE, M.D., Professor of Surgery in Cooper Medical College, San Francisco, is a pamphlet reprint from the *Pacific Medical and Surgical Journal*, descriptive of, and very justly holding up to deserved odium, the legal managers and their aids—two physicians of San Francisco—engaged in a recent alleged malpractice suit against Dr. G. W. Graves, of Petaluma. "The cause of action was based on the charge of improper treatment of an injury to the ankle of an old woman—one of those injuries where, despite the utmost care and skill on the part of the surgeon, the perfect use of the joint can never be regained. It was proven by written authority, as well as by prominent expert evidence, that the doctor had treated the case properly, and had obtained as good results as are ever gotten in such an injury." The case has already been tried three times—first, resulting in a verdict against Dr. Graves for $8000; second, disagreement of the jury; and third, acquittal of Dr. Graves. But the prosecution, it is said, are preparing for a fourth trial, and boast their intention to humble the profession who have nobly sustained Dr. Graves against the wiles of the world, the flesh, and the devil; namely, the plaintiff, her attorneys, and the two imps referred to—allied in the service of their father.

THE RICE FIELDS OF CAROLINA is the title of an illustrated article by HUGH N. STARNES in the *Southern Bivouac* for November. The methods prevailing on the rice plantations are described at length, and all the various processes in rice culture are carefully illustrated. The subject is one of unusual interest, and the article is the best of the series on Southern industries appearing in the *Bivouac*.

THE SANITARIAN.

DECEMBER, 1886.

NUMBER 205.

REPORT UPON THE MUSEUM OF HYGIENE.*

By THOMAS J. TURNER, A.M., M.D., Ph.D., Medical Director, U. S. N., in charge.

IN presenting this report upon the Museum of Hygiene, it is to be stated that the remarks of my predecessor, Medical Director John M. Browne, U. S. N., as to the necessities of the Museum, apply with increased force.

Since the last report the collection of sanitary and hygienic appliances has been increased by donation and purchase until there is now insufficient room for the proper presentation of the general exhibit, either for purposes of study or inspection. The like remarks apply to the library. The shelving is now full, and the constant addition of books, pamphlets, circulars, etc., upon hygiene, both general and special, has rendered it necessary to store these accessions upon the floor space. The library, from this fact alone, is becoming valueless for reference and study, and its usefulness is consequently impaired. The catalogue, still incomplete, now numbers over fourteen thousand titles. The great number of valuable publications, and more especially the recent literature of subjects pertaining to hygiene, are not available for study or reference because unbound. The necessity for an appropriation for binding needs no other demonstration. These facts are to be taken into consideration in connection with the circumstance that there has not been a day without some call for information either from plumbers, architects, medical men, or others interested in the means of preventing dangers to health.

* Published by authority of the Surgeon-General, U. S. Navy.

The necessity for a building for the objects of the Museum is apparent to any observer, and it is respectfully urged that the attention of Congress be called to this condition of affairs. Other countries have established institutions of like character, and the progress of sanitation in the United States, as presented in this Museum, is creditable alike to the originality of the presented inventions and the object sought to be obtained. Over thirty cases of models representing the baths at Bath, England, which formed a prominent exhibit at the late International Sanitary Exhibition, are now stored in the cellar. These models have been presented to the Museum.

The apparatus of Galton for anthropometry is stored and cannot be used for want of room. The attic is also crowded with unbroken packages. It is the opinion of those well informed upon such matters, after an examination of the present display, that it is overcrowded, and that twice the present area is necessary for proper presentation of the appliances, models, etc. There is need for a permanent clerk for the Museum. The clerical duties in cataloguing, indexing, labelling, etc., utilizes most of the time of the medical officers attached to the Museum, and there is but little time left for the pursuit of scientific study.

The changing of medical officers causes irregularity, and both system and method are subjected to too great variations by such changes. The officer leaving does not nor cannot leave his acquired knowledge to his successor, and a new arrival has of necessity the accumulated "dead work" to embarrass and obstruct his usefulness, and he, too, just as becoming efficient is detached and ordered to his more legitimate duty at sea, and so on again and again. The advantages of the Museum to original investigators and their investigations into matters connected with public health and the progress of preventive medicine are at present at their minimum for want of working room. It is respectfully suggested that the number of officers on duty at the Museum be increased, preference being given to those officers who have displayed interest in and are ready to work upon matters so important to the State as public health. The tools are here, but the workmen are not now on hand.

In the chemical, physical, and biological departments of the

laboratory—a part of the Museum—Surgeon Charles H. White, U. S. N., has been steadily engaged. Analyses have been made, both chemical and commercial, of various proprietary disinfectants; examinations of wood preservatives; oils, presented to the Bureau of Steam Engineering, for lubricating purposes; gas, air, and water analyses have been made and tentative experiments have been conducted toward improving water analysis, as well as to improving the methods of determining organic matter in the air.

In the physical department attempts have been made to define a standard by which to measure the relative viscosity of oils for lubricating purposes at determined temperatures, and also in colormetry as giving data for accurate measurements by instruments of precision.

The biological department has not been laid under service, but it is proposed to enter upon examinations in this direction, especially into the products made by the bacilli—the ptomaines and leucomaines. It is considered by the writer that these substances all belong to the ammonium series and are the exponents of the inverse metabolism of the amines, all tending to the ultimate isolation of nitrogen from animal organic compounds. It is also considered that the alkaloids existing in the vegetable kingdom may be found to be the result of cell action in such vegetable structures, closely allied to the action of the bacilli in animal matters. Should these projections become demonstrated facts their value, both in curative as well as preventive medicine, can readily be made plain. The toxic phenomena produced by these substances, both from the vegetable and animal kingdoms, appear to be alike when introduced into the system, and the same phenomena occur and appear in cases of uræmic intoxication from the retention of urea—a typical example of this class of bodies—as well as in typhus-fever where the glass rod moistened by HC_l and held in the expired air gives the reaction of the gaseous amines. It may be that the odors that characterize some diseases have a like origin.*

The comparison of the poisonous effects of the vegetable

* As this class of bodies is likely to be increased by future research, the name for the whole genera, it is hazarded, should be microb-amines, as expressing alike origin and composition.

alkaloids with the results of toxic effects of the various ptomaines and leucomaines, when introduced into the system, exhibit the fact that they are generically alike—nerve sedatives —narcosis marking one species, cardiac depression another, the functions of the spinal cord being affected in a third, and so on. The alkaline condition of the discharges in cholera, and their innocuousness when rendered acid, the acid treatment in typhoid-fever and the use of disinfectants in destroying the germ and its products, are all connected with this subject. The production of these alkaloidal bodies in the living body in health, as well as in disease, is now well determined.* Their elimination in normal physiological conditions ; their retention as perverting these conditions ; their causative agency in the production of disease in the body in which they are formed and in the bodies of others subjected to their action, are now the subjects of extended and careful research. The influence the results of such studies must have on the future of both sanitation and therapeutic medicine for good cannot be now calculated. The further metamorphosis of these amine compounds, manufactured by the microbes, by the action of the oxygen in the air, resulting, when in the presence of alkalies, in the production of the nitrates and nitrites of the bases and water, has received an industrial application in the manufacture of potassium nitrate for technical uses, more especially in the preparation of gunpowder. Whether it would be remunerative enough so to utilize sewage by this process of nitrification is yet to be determined. The like utilization of the refuse from abattoirs, furnishing the animal nitrogenous matter with potassium carbonate, is suggested for experimentation by the chemist as being a source of supply of potassium nitrate in time of war, should other sources fail in such emergency. The microbe can be furnished by the biologist, and the "environment" necessary, such as temperature, moisture, air, and other attendant phenomena, can readily be

* It may here be mentioned that the presence of these substances in animal products, used as foods, presents a further field of investigation to the biological chemist. The discovery of a poisonous alkaloidal body in cheese and in milk, after being kept for some time, by Professor V. C. Vaughan, are but the initiative steps in this research. There will occur other instances to the sanitarian, having perhaps a like solution, as causing disease-movement and suggesting preventive measures.

determined by experimental investigation with scientific accuracy. In one special direction in naval hygiene is attention called to these bodies. These alkaloids all appear as the results of retrogressive metamorphosis; as the production of organized matter, which in a broadly comprehensive way we call here bacteria, and in solutions undergoing the so-called putrefactive changes. Bilge water is a putrefactive solution. A spirochæte has been found in it, and in former publications of the writer bilge water was suspected, on grounds which are now evident, to be a source of febrile movement on shipboard. Cleanliness of the bilges must be insisted upon hereafter.

It is also proposed to investigate the slow chemistry of concentrated and preserved foods in order to determine the time when their nutritive value begins to decidedly decrease and when it ceases.

CREMATION.

From the increasing literature upon this subject is inferred a growing interest in the community upon this mode of the disposal of the dead. This object, of so much sanitary importance, might soon be obtained were it not hampered by so much of the emotional element that appears inseparable from its consideration, as well as certain medico-legal restrictions which can be readily removed. It must be evident to the enlightened sense of the community that such mode of burial is demanded in such diseases as small-pox, scarlet-fever, diphtheria, and the like. There are but few models of apparatus for cremation on exhibit in the Museum. There has been invented a portable crematory for use in rural districts, as well as in time of war.

MINING.

The successful adaptation of the electric light for mines and mining operations is now assured. Some experiments are on record in which it is attempted to discover how far the influence of tinted glass coverings to this light may be used in determining the presence of fire-damp, light carburetted hydrogen, the methane of the modern chemist. If these experiments are successful there will be an advance in the

better hygiene of mines. The miner's old oil lamp, rendering the air impure by its products of combustion and its vile-smelling acroleine odors; the Davy lamp, with its dim, lurid light, and the carelessness with which it is handled, will be things of the past, and thus the dangers to health, as well as to life and limb, in mines be removed.

SCHOOL HYGIENE.

Without entering upon an extended notice of this section of sanitary science, leaving out for the present the consideration of the school-house, a note here appears necessary concerning the hygiene of the eyes of school children. Some German sanitary observers in this direction have condemned the dark slates now in use on physiological grounds, and on the same grounds have suggested the use of white slates with dark pencils. Taking these premises, with the results of some personal experience and observation in determining ranges of vision, as well as of the color sense, the writer is led to suggest that a uniform "face" of type, as **antique,** be adopted for school-books, and that the traditional black printing ink be abandoned for inks of neutral tints in printing such books.

This accepts a proviso that the paper remains as now—white and unglazed. How far sharpness of definition of letters can be secured by such color use the printer can determine. Further observations may support the correctness of these suggestions; that there is a strain upon the nervous apparatus of vision in the reading of books as printed at present (black on white) is an accepted fact; that this strain is a cause of asthenopia is also well made out, and that the apparatus of accommodation in the eye is affected follows as a consequence. This strain, expressed in ordinary language as "tired eyes," is relieved by letters printed on tinted paper and by colored printing inks on white or colored paper; and thus a circus poster, from these facts, ofttimes contains more refreshing reading, in a hygienic as well as a mental sense, than some newspapers or books. It needs but the simple statement, in this consideration, that glaring colors are always to be avoided.

THE SIPHONAGE OF TRAPS.

The experiments, with the apparatus necessary for the purpose, upon the siphonage of traps which have been carried on at the Museum by Glenn Brown, A.A.I.A., have now been completed. The results of this investigation are forwarded with this report. It is an addition to the literature of this matter, and is to be placed alongside of the notes of Folsom, E. W. Bowditch, Waring, Philbrick, and others.

PREVENTION OF MALARIA.

To the list of plants proposed for use to modify or arrest the production of malaria, as in the eucalyptus and helianthus, there must now be added a water plant, the anacharis alsinastrum—the choke-pond weed, natural order, hydrocharidaceæ. Its rapid growth and spread in marshes and rivers where it has been planted, and the cessation and disappearance of malarial and diarrhœal diseases formerly affecting villages and towns about such localities, have been grouped into a relationship. It is now suggested to cultivate this aquatic plant in marshy districts with a view to prevent the production of malaria. Further experiment is necessary to determine the value of this plant in this direction, but there seems to be enough evidence of such value to warrant this note.

More especially interested in naval hygiene, it is with some gratification that attention is called to its progress as exhibited in the Museum and library.

AIR AND VENTILATION.

The model of the Fish Commission steamer Albatross, with the mode of ventilating that vessel, designed by Passed Assistant Engineer George W. Baird, U. S. N., is worthy the attention of the Naval Constructor. The improvements in ventilating shafts, with cowls for the ventilation of the berth decks of passenger vessels, show that the necessity for fresh air has at last become apparent to large steamship companies.

WATER.

The storage of water in iron tanks seems to leave nothing more to be desired in that direction, but the constant rusting

and the chalybeate taste of the water has been considered objectionable. Filtration does not remove this taste. Some years ago it was recommended that the interior of the tanks should be prepared by the Barff process to prevent rust. It may not be out of place here to suggest that this process might be usefully applied to chains, anchors, and shot. The aëration of water has been the cause of many patent appliances. Baird's aërator answers all purposes, and as it is attached to the distiller, the distillation, cooling, and aëration of water is completed by one process. The like is the result of the Normandy apparatus. The results of the observations of our medical officers upon water supply, as published in the reports of the Surgeon-General of the Navy, lead to the knowledge that there are few ports visited by our vessels of war at which the supply of potable water can be accepted for use on board ship with the confidence that no harm may result. Distilled water should be used at all times. On blockading duty no other water can be had save from an occasional rainfall, and it is no new thing to a naval sanitarian to state that such water is impure. It is again recommended that the interior of water-tanks be treated by the process mentioned to protect from rust. Of the hygienic use of distilled water it is to be noted that the absolute immunity of the squadron on the Asiatic station, in the years 1877–79, during the prevalence of epidemic cholera, and the decrease of all diseases of the bowels attended with flux, is ascribed to the use of distilled water on board of the vessels on that station. The pollution of the sources of water for the supply of cities by sewage, garbage, etc., is constantly being referred to by sanitarians as a steady and increasing danger to health. To remove these dangers will demand more attention in the near future than is now given them. The destruction of garbage should be by fire, and in cities a public crematory for such purposes is now a necessity. In the utilization of sewage there appears to be at present no profitable mode for such purpose. As a fertilizer its use appears to be best subserved by the process of intermittent, downward filtration in soils adapted to such usage. It may be that, failing to secure a degree of freedom from contamination that renders water "potable," the distillation and aëration of such non-usable

waters by some mechanical device adapted to the culinary apparatus will be part of the future house sanitation. As to the disposal of fecal matter, we should profit by the observations and experiences of Oriental nations, and return it to the soil in such manner as to avoid contaminating water supplies.

FOOD.

The attached table from the Bureau of Provisions and Clothing presents the United States naval ration as allowed by law, and the practical substitutes permitted. Without entering upon the detail of the value of each article as to its tissue-forming or heat-making value, it is believed to be an excellent ration. It is suggested that an extract of meat be added, to be used in connection with other animal foods after prolonged and exhaustive exertions of no matter what kind, as well as a part of the ration when salt meats are used. It is known that the addition of a meat-extract promotes the digestibility of salt food. In addition, the use of lactic acid is recommended as part of the ration. It is a natural constituent of the meat juices; is, perhaps, destroyed by cooking and diminished by salt-packing; is preferable to vinegar; has about the same commercial value, and it is proposed in this manner to restore it to the food. A rearrangement of the meal hours on board ship is suggested. The extremes to be avoided are, first, an excess of food in a given time, as meals too frequently repeated in such time, and, second, the interval between the meals be not too long. The total amount of food taken in the twenty-four hours should be distributed in accordance with physiological laws.

In the direction of the preservation as well as conservation of articles or products used as foods there does not appear to have been any unusual activity. In general terms it may be stated that the tendency in this direction has been directed by the studies on antiseptics, and the most prominent of these articles, boric and salicylic acids, with other known articles, enter into the composition of the preservative means suggested. They are of very questionable utility in the preparation of foods for diets, no matter how valuable their antiseptic properties.

TABLE SHOWING THE DIFFERENT ARTICLES OF THE NAVY RATION AND THEIR PRACTICAL EQUIVALENTS OR SUBSTITUTES, WITH THE QUANTITY OF EACH ALLOWED FOR ISSUE.

Articles named in the law.	Articles considered as included under names given in preceding column.	Quantity allowed per ration.
Bread	Biscuit	14 oz.
	Soft Bread	1 lb.
Flour	Cornmeal	As substitute for bread: 1 lb. — When issued with salt beef as flour only: 8 oz.
	Corn (Hominy)	1 lb. — 8 oz.
	Oatmeal	1 lb. — 8 oz.
	Rye	1 lb. — 8 oz.
	Wheat	1 lb. — 8 oz.
Pork	Salt	1 lb.
Beef	Salt	1 lb.
Preserved Meat	Roast Beef	12 oz.
	Canned Mutton	12 oz.
	Chicago Corned Beef	12 oz.
	Brawn	12 oz.
	Ham	12 oz.
	Bacon	12 oz.
	Sausage	12 oz.
	Fish: Dried	12 oz.
	Fish: Smoked	12 oz.
	Fish: Pickled	12 oz.
Beans		½ pt.
Pease		½ pt.
Rice		8 oz.
Dried Fruit	Dried Apples	2 oz.
	Peaches	2 oz.
	Raisins	2 oz.
	Currants	2 oz.
	Prunes	2 oz.
	Figs	2 oz.
	Dates	2 oz.
	(Or any other kind of dried fruit.)	
Butter		2 oz.
Tomatoes		6 oz.
Coffee *		2 oz.
Tea	May be substituted for each other	½ oz.
Cocoa	May be substituted for each other	2 oz.
Sugar		4 oz.
Pickles		½ pt.
Molasses		½ pt.
Vinegar		½ pt.
Fresh Meat	Beef	1¼ lbs.
	Mutton	1¼ lbs.
	Veal	1¼ lbs.
	Pork	1¼ lbs.
	Poultry	1¼ lbs.
	(Or any other kind of fresh meat.)	
Vegetables	Fresh (such kinds as can be procured)	1¼ lbs.
	Canned (assorted kinds)	6 oz.

* The allowance of coffee here given is not to be exceeded by substituting more coffee for tea or cocoa, but the last two articles may be substituted for each other at the discretion of the commanding officer.

CLOTHING.

The ventilating "water-proof garments" of the variety known to sailors as "sou'-westers," made from heavy duck and rendered water-proof by boiling linseed oil, are on exhibit in the Museum. A single complete outfit of the clothing furnished to the crews of our vessels has been required for exhibit. Its total weight is as follows:

Article.	Weight.
Overshirt	1.56 lbs.
Undershirt, heavy	1.00 "
Undershirt, light	0.46 "
Drawers, heavy	0.92 "
Drawers, light	0.47 "
Working suit	2.75 "
Satinet trousers	1.59 "
Cloth cap	0.28 "
Canvas hat	0.25 "
Socks	0.27 "
Shoes, calf	2.19 "
Shoes, kip	2.22 "
Boots	3.70 "
Leggins	0.39 "
Overcoat	4.62 "
Watch-cap	0.25 "
Silk handkerchief	0.08 "
Cap ribbon	0.02 "
Rain hat	0.48 "
Rain coat	3.20 "
Rain trousers	2.58 "
Total weight	28.38 "

I am informed by Paymaster George H. Read, U. S. N., in charge of the naval clothing factory, that the heavy underclothing in the above outfit contains twenty per cent of cotton, thus diminishing the shrinkage, etc. The establishment of the naval clothing factory is a step toward improving the sanitary surroundings of the sailor, and under its present scientific management leaves little or nothing to be desired. I am not able to furnish the data as to texture, weight per yard (square),

strength of warp and woof, dye, hygroscopic, heat-conducting, and radiating values of the fabrics used. The traditional blue color still remains. These factors have their sanitary value, but it is doubtful if they have all been collectively considered in the new outfit proposed. The experience as to color of clothing of the British troops in India has long been known, yet appears as a re discovery in a report upon the late expedition to Panama. It is stated that the total amount in weight carried by a sailor equipped for service in the field, ashore, plus two days' rations, amounts to 49 lbs. 9 ozs. The naval medical officer will at once consider this amount carried with the work to be done, say in marching, and apply Haughton's formula to determine the length of the march and the rest, and so advise the commanding officer to that effect, in order that the efficiency of the "blow" may not be impaired by weakened condition of the sailor from useless over-exertion.

In estimating the work done it is to be remembered that the effective work of a strong, healthy adult is computed and accepted as 300 tons, lifted one foot high, in 24 hours. The formula mentioned is: $(W+W')\times D\div 20\times 2240$. W is the weight of the person, W′ the weight carried, D the distance walked in feet, 20 the co-efficient of traction, and 2240 the number of pounds to the ton. The result is the number of tons raised one foot. About 3.1 miles per hour is the rate of marching at which the greatest amount of work is done with the least expenditure of energy. It is well to consider the temperature of the air during such exercise and to bear in mind both the "law of fatigue" and of "refreshment." The fit of the clothing and the distribution of the weights to be carried have been under consideration by other officers. There is but one rule in this matter—have nothing impede the respiratory or circulatory apparatus.

LIGHTING.

The use of the electric light on shipboard has proved of service. The vitiation of the air from the combustion of oil and candles is ended. Recurring to the oft-repeated fact of the etiolation of plants from the absence of light and the blanched appearance of miners and others whose avocations are "in darkness," it will be of value to the observant medical

officer to notice what effect the present system of lighting has upon the hæmatosis which furnishes the "ruddy cheek of health."

TRANSPORTATION OF THE SICK AND WOUNDED ON SHIP-BOARD.

The cot for transporting sick or wounded, designed by Medical Director A. L. Gihon, U. S. N., has so long been known and is so efficient that it requires no comment. The ambulance cot of Medical Director A. C. Gorgas, U. S. N., is also well known, as well as that of Medical Inspector H. M. Wells, U. S. N. A knit hammock, for a like purpose, is on exhibit in the Museum, designed by Thomas Graham, pensioner, U. S. N.

COOKING.

A model of the improved ship's galley, designed by William Young and in use in the service, is also on exhibit. It seems that a man-of-war's galley can only be understood by a man-of-war's man, for in all the contrivances adapted to utilize cooking space, galleys invented by sailor-men economize the space assigned to its limit. This galley, as far as is known, has few defects.

DISINFECTION AND DISINFECTANTS.

Models of stoves for the purpose of disinfecting bedding, etc., at high temperatures are on exhibit in the Museum. There does not appear to have been much progress since the issue of Sternberg's essay on disinfection, by the American Public Health Association, in the scientific determination of the value of disinfectants. The journals on file contain notices of the application of numerous derivatives from the wood and coal-tar products, asserted to be efficacious both as disinfectants and deodorizers. Judgment as to their real value must be suspended until further experimental research shall have placed them where they properly belong. The steam-atomizer, invented some years ago by Medical Inspector H. M. Wells, U. S. N., and originally adapted for the use of carbolic acid solutions in the disinfection of vessels, if now made of materials

not acted upon chemically, could be utilized for the mercuric bichloride solutions now used for such purposes.

CREW.

The development of high-powered guns, with the attached machinery, has introduced such implements of warfare into the class of "instruments of precision," and by its evolution has diminished the number of men formerly entering into guns' crews, consequently "the average number of crew" in all statistics is also diminished. This diminution, if carried out, will give more superficial area to each sailor, and consequently more cubic air-space, and so these constant sources of impairment of health on shipboard, "limited area and small air-space," will in like manner be diminished. It seems like a process of useless iteration to refer to the well-known law that with density of population—*i.e.*, so many persons to a square mile or acre—so is the increase of the sick and death rates, and that even with the best appliances, less than 400 cubic feet, for each person on shipboard, cannot be ventilated in the proper acceptation of that term. This amount was recommended by the Fourth National Sanitary Convention, and the rule still holds good, even with all the modern means to secure fresh air in inclosed spaces. The old-time sailor is passing away—has passed, in fact, and the guns' crews now are no longer "Jack Tars," but skilled artisans, and with this skilled labor has come a more manly self-respect and the desire for better surroundings than formerly existed, and which, if not granted, leads to inevitable dissatisfaction. How far the extension of a better environment is to be carried the writer is unable to determine. The authorized regulation space for a soldier in the English service is 600 cubic feet, and it certainly is not asking too much for a sailor that as near that amount may be assigned to him, taking into consideration all his environment.

In the U. S. S. Dolphin 68 cubic feet per man is the berthing space on the berth-deck. It is too small from physiological considerations; is below that given to an emigrant in the short passage across the ocean (72 cubic feet). The known ill effects of re-breathed air; of the depressed vital conditions induced by impure air from overcrowding, added to constantly

wet decks; the diminution of the resisting power to disease movement; the epinosic condition—in fact, all these enter in the future into the etiology of disease on shipboard. This small cubic-space has now become a potential factor in determining "origin in line of duty." Late reading of published papers upon the future naval organization are marked with the idea of making the modern vessel of war do duty both as a fighting ship and as a transport, and by such means not to diminish the crew. Whatever is done in the direction of the double duty of fighting vessel and transport, it should be remembered is done at the expense of health, and in just that diminution is the efficiency impaired. The solution of the question will come in time.

In all these considerations the fact must not be lost sight of that "the trade is War."

LIFE-SAVING APPARATUS.

There are numerous appliances for such purposes—rafts, jackets, and mattresses—and all could be utilized in case of necessity. The Museum has many such contrivances, all of which present some advantages.

HAMMOCKS.

There appears to have been no change in the hammock. It is to be hoped that some inventive genius may construct one that will do away with the bad position that the body has to assume while sleeping in one. The more especially should such a hammock be used in the training vessels, where the growing apprentices may be at least freed from any tendency to spinal deformities which the position during sleep in a hammock inevitably tends to produce. It is suggested in this connection that the crew be divided into three watches, for the purpose of securing the proper amount of sleep and rest. The suggestion is not new, and the present appears to be the time to advance in this right direction; all experience goes for nothing if it is to be accumulated and not used.

FIREMEN AND COAL-HEAVERS.

Following closely upon the division of the crew into three watches for rest and sleep comes the consideration of the

hygiene of the engineer's division. The new fire-rooms are to be under an increased air pressure when the vessel is under steam. This factor of increased air pressure is to be added to the effects of high temperature, and the results of this sum upon the health is looked for with interest. Forecasting from the known results of each factor separately upon the health of workmen, it is conjectured that, plus the exhaustion induced by the heat, there will be in some degree phenomena that occur in the "caisson" disease, and that the brunt of these influences will be evidenced by some impairment of the functions of the spinal cord. This exposure must of necessity occur, and to limit such it is suggested to divide this department into four watches, when upon duty, as affording the necessary time for a re-approach to a recovery of a normal condition.

THE MEDICAL OFFICER ON SHIPBOARD.

It does not need any demonstration that, with the increase of the efficiency of men-of-war as fighting machines, or the tactical management of troops on shore, the duties of the medical officer have vastly increased, and are out of proportion to his present position. In addition to his duties in the care of the sick and wounded, the prevention of the causes of disease in the men and the means for the preservation of their health demands an amount of practical knowledge and vigilance that belongs alone to his profession. With the political aspects of war he has nothing to do, as such; all his efforts are to conserve the health of the men, so that their strength and endurance, when the moment for fighting has come, are at their maximum and kept so. The action over, his duties are obvious, and need not be narrated. To those who have had the experience description is out of place, and to those who have not, no description can adequately detail that duty. And even in the groaning wards of his perhaps improvised hospital his sanitary vigilance and knowledge is not to be hampered, for he recognizes in even this assemblage of sick and wounded enemies to the health of those around. From my own experience I have stated that the medical officer of a vessel of war should be, by law, her sanitary officer, and recent events in the ocean steamship service lead me to believe that

in this respect the mercantile marine will be far in advance of the naval service. What rewards, what definite position the naval surgeon is to have in the future naval hierarchy, is at present conjectural, and will remain so until settled in some manner alike creditable to all concerned, which will only be when calm, impersonal, and unselfish logical deductions are received and accepted.

HYGIENIC AND SANITARY EMERGENCIES.

Mention is made of these subjects simply to recall to the medical officer that he may be called upon to improvise means of transportation, for the shelter of sick and wounded, for hospital purposes, etc. In these matters

"The readiness is all."

The length of time that I have been upon the present duty does not permit me to give in further detail the recent progress in sanitation. Other duties, however, have not prevented the writer from noting the currents in the direction favorable to public health. A cursory survey of the stream may not prove unacceptable.

The reports of the various State Boards of Health mark the increasing interest and vigilance of physicians as guardians of public health. In each report the sanitary wants of the State obtrudes itself at once. The prominent industries in each locality finds some sanitarian making his observations for the commonweal upon its hygiene; here another keeps track of the hygiene of schools; another watches over the sanitation of the charities; there is in our country hardly an industry or charity, hospital or asylum, reformatory or prison, market or farm, house, or village, or city that has not some earnest worker in preventive medicine. Not only is the physician engaged; the artisan at work upon "the preservation and conservation of foods" calls in scientific knowledge to his aid. Adulterations, as affecting public health, have already secured national legislation; even the use of stimulants and narcotics has given rise to a political element in public affairs, in so far as they affect the general health. Railroad travelling, on some of the prominent roads, has its ambulance system, and the traveller by sea is being cared for as regards his health and

safety. The architect and engineer design and construct the works whose necessity the sanitarian has demonstrated, for drainage, the removal of excreta, the sewage, and for water supply. The disposal of sewage and excreta is becoming daily of more concern to the agriculturist, engineer, and sanitarian.

The experiments upon the deportment of soils toward human excreta in various stages of change that have been inaugurated in Japan are of extreme interest to the farmer and sanitarian, as exhibiting the disinfecting power of various soils—that is to say, in the destruction of minute organisms by the agency of earth, and also to the engineer as to the means of transportation to localities, the excreta, where such fertilizer is needed. The results of these investigations, as far as can be ascertained, are akin to those found by Professor R. Pumpelly for the National Board of Health, and which are to be found in the report of that body for the year 1861.

In industrial hygiene the effects of the inhalation of the dust from the manufacture of slates and slate pencils for schools has called for well-known devices to get rid of the dust in the breathing air. The lung affections caused by the inhalation of this dust need not be erected into a new disease, to be called slatemaker's asthma, bronchitis, or phthisis, for the phenomena are the same as those produced by the mechanical irritation of any finely divided particles of matter so inhaled.

The carriage of disease germs by ships, crews, and cargoes, and the prevention of the introduction of contagious and infectious diseases by all the means and appliances which should be grouped in the modern and scientific use of the term "maritime sanitation," have not escaped observation.

The pending national legislation to regulate inter-state commerce has a sanitary aspect that may in future prove of importance when there comes to the country the much desired national laws regulating "quarantine." Elsewhere I have cited the opinions of such jurists as Justices Marshall, Story and Grier, that "quarantine laws, health laws, etc., are regulations of commerce." How far the proposed inter-state commerce bill may make a classification of *goods* coming from infected places, or as to the *modes of conveyance—i.e.*, railroad cars, canal boats, steamboats, etc., becoming carriers of disease

germs of themselves—or of infected goods, or in what manner this proposed *inter-* (between and among) state laws may come in contact with *intra-* (within) state regulations of commerce, quarantine law, or health ordinances is unknown. As to *persons*, however, they are not the objects of commerce, and do not fall within the reasoning founded upon the construction of the power given by Congress, by the Constitution, to regulate commerce (City of New York *v.* Miln, 11 Peters, 102). What commercial regulations are to apply to a person suffering from a contagious or infectious disease in transit anywhere in the United States, among the States, cannot now be definitely formulated; within a State, that State's quarantine, health, and police laws now govern.

My own views upon this subject are of record, and the principles advanced have not changed even in the light of the recent International Conferences, but have been more decidedly fixed.

In the adaptation of the principles is the labor and toil.

FIRE-PROOF DRESSES.—Many chemicals have been used from time to time to render ball-dresses and other textile fabrics incombustible, but one of the most efficacious and least expensive is *tungstate of soda*, which may be most conveniently applied by mixing it with the starch for dressing: Add one part of the tungstate to three parts of good dry starch, and use the starch in the ordinary way. For fabrics which do not require starching, dissolve one pound of tungstate of soda in two gallons of water, well saturate the fabric in the solution, and let it dry.

It will not change the most delicate colors or affect the quality of the fabric in any way, and ironing will not in the least interfere with the efficacy of the process. Muslins or silks so treated may be held in the flame of a candle or gas without catching fire, so that, although the portion in contact with the flame by continuance may be charred or even destroyed, there is no danger of spreading the combustion.

HEALTH OF THE U. S. ARMY FOR JULY, 1886.

DURING the month of July, in eight military departments, embracing 141 military posts and arsenals and 40 commands operating in the field, from which reports were received, there was returned a total mean strength of 23,345 officers and enlisted men.

There were admitted to sick report 2865 cases of disease and injury, or 123 per 1000 of mean strength.*

This is a decrease of 18 per 1000 below that for July, 1885, and 19 per 1000 below the average monthly rate for the ten years (ending December 31st, 1884), which was 142 per 1000 of strength.

Twenty deaths occurred, as against 13 for the previous month, and 19 for the previous July. This represents an annual mortality from all causes of 10.3 per 1000, or 2.4 per 1000 less than the average for the preceding decade, which was 12.7 per 1000 of mean strength.

The number of discharges for disability was 55,† representing an annual loss to the army from this cause of 28 per 1000 of strength.

The number of troops constantly non-effective from sickness was 916, or 39 per 1000 of strength, being 2 per 1000 greater than that for last month. The rate for the previous July was 41 per 1000, and for the previous decade 44 per 1000 of strength.

The rate of recoveries to the whole number under treatment was 731 per 1000; the rate of deaths, 5 per 1000.

The causes of admission, and those which have chiefly served to impair the health of the army during the month of July, are shown in Table I.

---

* The names and diseases of all officers and enlisted men who are excused from any part of their military duty by reason of disability are required to be entered upon the reports from which these data are drawn.

† Recruits at depots, discharged for disability which existed prior to enlistment, not included.

TABLE I.

Causes of admission in the order of their numerical importance.	Number of cases.	Rate per 1,000 for July, 1886.	Average rate per 1,000 for ten previous Julys.	Increase or decrease of rate.
First.				
Diarrhœal diseases	646	27.68	32.82	— 5.14
Diarrhœa	578	24.76	28.17	— 3.41
Cholera-morbus	41	1.76	1.76	0
Dysentery	27	1.16	2.89	— 1.73
Second.				
Injuries and accidents	498	21.34	21.65	— .31
Contusions and Sprains	265	11.35	14.23	— 2.88
Incised, punctured, lacerated and contused wounds	122	5.23	4.25	+ .98
Fractures (not shot)	9	.39	.66	— .27
Shot wounds	7	.30	.89	— .59
All other injuries	95	4.07	1.62	+ 2.45
Third.				
Diseases of the digestive system.	352	15.08	?	?
Constipation, dyspepsia, and colic	204	8.74	11.92	— 3.18
Tonsillitis, pharyngitis, and sore throat	41	1.76	?	?
Other diseases of this class	107	4.58	?	?
Fourth.				
Malarial-fever and resulting conditions	288	12.34	21.50	— 9.16
Fifth.				
Venereal diseases	158	5.76	?	?
Gonorrhœal diseases	78	3.34	4.08	— .74
Syphilis and results	40	1.71	3.92	— 2.21
Other venereal diseases	40	1.71	?	?
Sixth.				
Diseases of the nervous system	133	5.70	12.16	— 6.46
Headache and neuralgia	113	4.84	10.41	— 5.57
Other diseases of this class	20	.86	1.75	— .89
Seventh.				
Rheumatism	131	5.61	8.80	— 3.19
Eighth.				
Diseases of the respiratory system	100	4.30	7.75	— 3.45
Catarrh	49	2.10	4.25	— 2.15
Bronchitis	23	.99	2.08	— 1.09
Pulmonary phthisis	6	.26	.37	— .11
Pleuritis	3	.13	.39	— .26
Pneumonia	2	.09	.21	— .12
Other diseases of this class	17	.73	.45	+ .28
Ninth.				
Enteric-fever	14	.60	.36	+ .24
Tenth.				
Typho-malarial-fever	0	—	.37	— .37

The average duration of treatment among patients who recovered was 9 days, and among those who died, 34 days. The causes of deaths were returned as follows: Enteric-fever, 4; cardiac degeneration, 2; remittent-fever, 1; Bright's disease, 1; valvular disease of heart, 1; pulmonary phthisis, 1; bronchitis, 1; cancer, 1; concussion of brain, 1; crushing by railroad train (accidental), 1; drowning (accidental), 1; poisoning (suicidal), 2; shot wounds, 3, 1 of which was accidental, 1 suicidal, and the other homicidal.

The ratio of mortality from enteric-fever to cases treated was 18.2 per cent; pneumonia, 0; and from pulmonary phthisis, 5 per cent.

Of contagious and infectious diseases there were 6 cases of measles, 1 of diphtheria, 1 of mumps, and 1 of whooping-cough.

A comparison of the health of the several military departments is given in Table II.

TABLE II.

	Admission rate per 1,000 of mean strength.	Number of troops per 1,000 of mean strength constantly non-effective from sickness.	Average number of days treated among patients who recovered.	Rate per 1,000 of deaths to number of cases treated.
Department of:				
Texas	178	42	10	0
Platte	145	35	7	6
East	139	42	8	7
Dakota	113	37	10	3
Missouri	112	33	10	4
California	100	32	5	10
Arizona	97	37	12	11
Columbia	88	33	13	0
The entire army for the month	123	39	9	5
The entire army for the preceding decade, monthly average	142	44	?	7.5

Among the more important diseases under treatment during the month of July, those remaining sick from the previous

month being included, were 22 cases of enteric-fever, 14 new cases being reported; 11 cases of pneumonia, only 2 of which were new admissions; and 20 cases of pulmonary phthisis, 6 of which were newly admitted. This is an increase of 12* cases of enteric-fever and a decrease of 1 case of pneumonia and of 4 cases of pulmonary phthisis from the whole number under treatment in June.

Thirty-nine posts have shown admission rates for the month which were greater than the normal of 142 per 1000 of mean strength, and 101 less.

In the Department of Texas, 54 per cent of the posts gave admission rates above the normal. In the Department of the East and of the Platte, each 33 per cent; in the Department of Columbia, 25 per cent; in the Department of California, 23 per cent; in the Department of Arizona, 20 per cent; in the Department of Dakota, 19 per cent, and in the Department of the Missouri, 13 per cent.

The posts showing the highest rates per 1000 of strength were: Fort Omaha, Neb., 366; Indianapolis Arsenal, Ind., 346; Springfield Armory, Mass., 283; Little Rock Barracks, Ark., 278; David's Island, N. Y., 256; Fort Davis, Tex., 256; Camp Poplar River, Mon. Terr., 253; Fort McKinney, Wyo. Terr., 230; Fort Randall, Dak. Terr., 223; Fort McIntosh, Tex., 221; Fort Gibson, Ind. Terr., 217; and Fort Concho, Tex., 210.

The lowest admission rates were: Fort Mason, Cal., 0; Fort Elliott, Tex., 19; Fort Union, N. M., 22; Fort Ontario, N. Y., 23; Fort Mackinac, Mich., 27; Fort Bowie, Ariz. Terr., 28; Watertown Arsenal, Mass., 31; and Angel Island, Cal., 39 per 1000 of mean strength.

Thirty-seven posts have shown rates of constant non-effectiveness from sickness above the normal of 44 per 1000 of mean strength, and 102 less.

In the Department of Texas 54 per cent of the posts furnished rates of constant non-effectiveness from sickness above

* Diagnosis was reached during this month in 3 cases of enteric-fever admitted in June, but undeveloped until July; 2 at St. Augustine, Fla., and the other at San Carlos, Ariz. Terr., all of which had a fatal termination during the month.

the normal. In that of Arizona, 40 per cent; of Dakota, 29 per cent; of the East, 23 per cent; of the Platte, 17 per cent; of California, 15 per cent; of the Missouri, 13 per cent; and of the Columbia, 12 per cent.

The posts showing the highest constant rates were: San Diego Barracks, Cal., 108; Fort Lowell, Ariz. Terr., and Fort Wadsworth, N. Y., each 101 per 1000; Fort Brown, Tex., 93; Fort Hancock, Tex., 84; Jefferson Barracks, Mo., 80; Fort Huachuca, Ariz. Terr., 78; Indianapolis Arsenal, Ind., 76; and Fort Davis, Tex., 75 per 1000 of strength; while the lowest rates were: Fort Mason, Cal., 0; Fort Trumbull, Conn., 3; Fort Klamath, Ore., 4; Fort Ontario, N. Y., 7; Fort Myer, Va., 8; Fort McDermitt, Nev., 12; and Angel Island, Cal., 13 per 1000 of mean strength. At stations reporting high admission rates, diarrhœa, malarial-fever, diseases of the digestive system, and rheumatism, together with injuries, have prevailed.

The causes producing high constant rates were diarrhœa and malarial-fever, together with a few cases of the more chronic disorders, as pulmonary phthisis, enteric-fever, heart disease, and gunshot wounds.

Enteric-fever during the month of July existed at twelve stations, as follows: At West Point, N. Y., and at Fort Huachuca, Ariz. Terr., each 4 cases; St. Augustine, Fla., 3 cases; Fort Assinniboine, Mon. Terr., and Fort Davis, Tex., each 2 cases; and the following, Fort Niobrara, Neb., Fort Wayne, Mich., Fort Monroe, Va., Fort Grant, Ariz. Terr., Fort Douglas, Utah Terr., Fort Riley, Kan., and San Carlos, Ariz. Terr., each 1 case. Of the above cases, those at Fort Huachuca, Ariz. Terr., were all new admissions, while at West Point, N. Y., 3 were newly admitted; at Fort Grant, Ariz. Terr., Fort Monroe, Va., Fort Douglas, Utah Terr., Fort Riley, Kan., Fort Niobrara, Neb., Fort Assinniboine, Mon. Terr., and Fort Davis, Tex., each 1 new case.

Four deaths occurred from this disease—2 at St. Augustine, Fla., 1 at San Carlos, Ariz. Terr., and the other at Fort Grant, Ariz. Terr.

Pneumonia existed at 10 stations, as against 9 for June and 12 for May. The cases newly admitted occurred at Fort Sill, Ind. Terr., and at David's Island, N. Y., 1 each. Those

reported from the other stations were cases remaining from previous month.

Measles was reported at Columbus Barracks, O., 5 cases, and at Fort McHenry, Md., 1 case.

Diphtheria, 1 case, at Newport Barracks, Ky.

Whooping-cough, 1 case, at Fort Mojave, Ariz. Terr.

Mumps, 1 case, in a field command in New Mexico.

The post-surgeon at the Military Academy, West Point, N. Y., gives the following statement in reference to 4 cases of enteric-fever existing at the Soldiers' Hospital:

"One case of typhoid-fever was reported taken sick last month, and 3 more have been taken sick this month, all from the detachment of cavalry, United States Military Academy.

"There have been in the command 9 cases of typhoid-fever since July 5th, 1885; 8 of these have occurred in the detachment of cavalry, and 1 in the detachment of artillery. Repeated and most careful examinations of the barracks and their surroundings, water supply, and drainage has been made without discovering any unsanitary condition or source of infection. Three of the 4 cases now under treatment are men who do not live in the barracks, and their surroundings may be passed over in searching for the source of the disease. As 8 of the 9 cases have occurred in the cavalry detachment, which numbers not quite one fourth of the enlisted men of the command (cavalry detachment, 70; total strength, 291), it appears reasonably certain that the men of this detachment are especially exposed to the typhoid poison in some manner not in common with the others. The special duty of the cavalry detachment differing from that of the other enlisted men at the post consists in the stable duty. The cavalry stables, situated nearly half a mile from the barracks, are seldom visited by any one except cavalrymen. Close by the stables is a spring of clear, cool, sparkling water, from which the men are in the habit of drinking freely. This spring is on the hillside, below the plain, on which stands the cadet barracks, officers' quarters, and other buildings of the academy, and some portion of the drainage of this plain doubtless finds its way into it.

"I am unable to suggest any more probable source of contamination of its waters by the typhoid poison than the sup-

position that by some of the cases of typhoid-fever which have occurred in the post some of the cesspools (now closed) may have become infected, and the poison from them has at length found its way into the source of the spring.

"The one case of typhoid-fever occurring in the artillery detachment is corroborative, rather than otherwise, of the supposition that this spring may be the source of infection, since the patient in this case was engaged at the time on duty which brought him frequently near the cavalry stables, and he states that he was in the habit of drinking daily at the spring in question.

"Until some further light can be thrown on the origin of these cases of fever, I would respectfully recommend that the use of this water for drinking be discontinued. The small room situated at the west end of the cavalry stables and occupied by the stable guard is very damp, the drainage from the higher ground being directly toward and under it, and the floor of brick resting directly on the ground. The sanitary condition of this room would, in my opinion, be materially improved by replacing the brick floor with one of plank sufficiently raised from the ground to leave a suitable air-space underneath."

The post-surgeon at San Carlos, Ariz. Terr., states: "Two cases of typhoid-fever developed here during the first part of the month; one proved fatal, and the other was transferred to the hospital at Fort Grant for treatment.

"In consequence of the occurrence of the two cases so near together, a thorough investigation of all the causes by which this formidable disease might be generated was made. No positive cause could be established, and inasmuch as the two cases were distinctly separate, one belonging to the white detachment and the other to the colored cavalry troop on duty here, living in separate camps, boarding at separate messes, using separate sinks, and probably having no personal communication with each other, it is not believed that the second case was in any manner due to contagion. Both cases were doubtless sporadic, and their occurrence at about the same time purely a coincidence. No other cases have developed."

Reports received from 40 commands operating in the field

showed an aggregate mean strength of 1770 officers and enlisted men.*

One hundred and seventeen cases, or 66 per 1000 of mean strength, were admitted to sick report during the month, of which number 7 were transferred to permanent stations for treatment, and appear upon their returns.†

Of these admissions 77, or 66 per cent, were for disease, and 40, or 34 per cent, for injuries.

Seventeen commands were operating or *en route* in the Department of Arizona, their strength aggregating 1003 officers and enlisted men, with 52 cases of disease and injury, or 52 per 1000. Eight commands in the Department of the Platte, representing a total mean strength of 312, with 43 cases of disease and injury, or 138 per 1000. In the Department of the Missouri 5 commands, aggregating 129 officers and enlisted men, with 16 admissions to sick report, or 124 per 1000. In the Department of the Columbia 5 commands, aggregating 173 officers and enlisted men, with 2 admissions to sick report, or 12 per 1000. The Department of California had 2 commands, representing an average strength of 32 men, with 4 admissions to sick report, or 125 per 1000. The Department of the East had 2 commands, aggregating 92, and the Department of Texas 1 command of 29 officers and men, and none sick.

The prevalent disorders among troops in the field were malarial-fever, diarrhœal diseases, diseases of the digestive system, and injuries.

Attached to the army, and living at the different military stations, were 5142 women and 6275 children, the wives, children, and servants of the officers and enlisted men.

Among the women were reported 470 cases of sickness during the month, or 91 per 1000 living. Five deaths occurred, representing an annual death rate of 11.7 per 1000 living. The causes of deaths were reported as follows: Diarrhœa, 1; peritonitis, acute, 1; consumption, 1; cerebral tumor, 1; and 1 reported as "general debility."

* There were other commands in the field to which no medical officers were attached, and from which this office received no reports.

† To avoid duplication, these cases are dropped in the final consolidation of the entire army.

Among the children 443, or 71 per 1000, were taken sick. Eight deaths occurred (6 of which were of those under five years of age), representing an annual death rate, at all ages, of 15.3 per 1000.

The causes of deaths were reported as follows: Cholera infantum, 2; pneumonia, 1; teething, 1; marasmus, 1; convulsions, 1; inanition, 1; and unknown, 1.

Measles was reported among the children at Fort Wayne, Mich., 7 cases; Fort McHenry, Md., 6 cases; and at Fort Wingate, N. M., 1 case.

Whooping-cough at Fort Adams, R. I., 3 cases, and at Camp Poplar River, Mon. Terr., 1 case.

Erysipelas, 2 cases, was reported at Fort Riley, Kan.

The following brief statements in reference to contagious diseases appear under general remarks on the reports of the posts referred to:

Fort McHenry, Md.—During the month measles appeared among the families of married soldiers living within the fort, also in the family of the post trader.

Fort Adams, R. I.—The epidemic of whooping-cough has been confined to the families of officers, and is receding. It is thought that all persons not protected by a previous attack have suffered, and there is one instance in a child of a second attack within five years.

Of non-infectious diseases, diarrhœas and malarial-fevers have prevailed extensively, while diseases of the digestive system and respiratory catarrh may be mentioned as next in order of prevalence.

BENJAMIN F. POPE,
Major and Surgeon U. S. Army.

RECORD AND PENSION DIVISION
SURGEON GENERAL'S OFFICE,
WASHINGTON, D. C., November 10, 1886.

A COLONEL was once complaining that, from the ignorance and inattention of the officers under his command, he was obliged to do the whole duty of his regiment. Said he, "I am my own captain, my own cornet, and"—"your own trumpeter," said the lady he was addressing.

SEWAGE UTILIZATION BY IRRIGATION.

Address by Dr. ALFRED CARPENTER before the Farmers' Club, Croydon, Eng., June 3, 1886.

THE President of the Club spoke of sewage farming as being a subject of great importance; indeed, he might say that its importance in the majority of cases had not been grasped. It was of the utmost consequence, not only to Croydon and its district, but to the world at large. He then called upon Dr. Carpenter, who said the subject of sewage farming was one which had recently been brought under the notice of the inhabitants of Croydon, in consequence of a very proper attempt on the part of the corporation to enlarge their borders at Norwood, and to increase the area of the farm which was so absolutely necessary to be increased for the purpose of utilizing the sewage of that district, and preventing nuisance. When doing that the corporation had done him the honor of calling him as a witness on behalf of the extension of the farm. He gave evidence at the inquiry before the Government Inspector, and some portion of his evidence had been reported in the local press. Observations also were made on both sides upon his evidence, which told him very satisfactorily that, so far as sewage farming was concerned, there was very little real information on the subject, and that it was but little understood even by those who had the management of the farm at this moment. He observed, too, that in consequence of the want of knowledge on the part of the opposing counsel he was not cross-examined properly, and their lack of information on the subject prevented them from bringing out the weak points of the system at present in operation. It was from no personal object that he presumed to offer any remarks to the Croydon Farmers' Club, except for the purpose of placing himself in a right position in the event of anything happening in connection with either the Beddington or the Norwood Sewage Farms. His

object was to place before the Farmers' Club the right steps which ought to be followed in sewage farming, and to insist upon their being carried out, so that he might be free from any kind of blame in having given an apparently tacit support to things as they now existed at Beddington. There was a right way and a wrong way to conduct a sewage farm. Occasionally the right way was followed in Croydon, and occasionally the wrong, and it was in connection with the right way that he wanted to put his observations before the Club, and to show how a departure from the right way must end in failure and disaster, in the first instance financially, and ultimately by affecting the health of a district, provided that some of the conditions now in operation were persevered in. They might perhaps say what could a doctor know about farming? Well, he would confess that he did not know a very great amount about ordinary farming. He had some little knowledge obtained in his younger days, when he was a boy, and used to be very much among farmers and saw something of the work. It was quite true that he had not seen very much of farming, in an agricultural sense, since then, but he would point out to his hearers that sewage farming and agricultural work as carried on in an ordinary farm were two totally different things. If you went into sewage farming in the belief that you should conduct it on ordinary agricultural lines, you would fail altogether. He made that remark because he was on the local Board of Health before he came into contact with the Sewage Farm, and he was on the Board when the farm was established, and for nineteen years he watched the work and gathered information from the experiments that were made. He gained his information there, as well as some others whom he saw before him had done, and he was quite certain that sewage farming, if carried on on unsound principles, could not meet with financial success, and if we did not profit by our failures it would be very serious for the inhabitants of Croydon in the end. There were two ways of dealing with sewage—a dry way and a wet way. There was the water system and the earth-closet system. In his view there was no occasion for any sewers in country places unless there was a water supply that was sufficient and ample. It was much better to be without sewers than to have them, and therefore

in country villages there should be no sewers. But with regard to the towns, where there was necessarily a water supply provided by the local authority, it was requisite that there should be sewers to carry it away after use, and it had been found from experience that the removal of human refuse from houses by the silent highway was done in a much more efficient manner than by any kind of earth-closet or dry system. He had examined the various systems in different parts of the country, the pail system, the earth-closet system, systems in operation at Glasgow and other large towns, such as Leeds and Manchester, and he had come to the conclusion that the only proper way of dealing with the sewage of those districts was by utilizing the water power that was necessarily introduced into the houses. The water-closet system was the only proper way of dealing with the subject in populous towns. He would not go into the various reasons he had for coming to that conclusion, but he would merely say that, so far as Croydon was concerned, the water system was the best. We had an abundant and excellent supply of water, and had, in addition, all the conditions that would lead to a satisfactory utilization of the sewage on the Beddington Farm; no pumping was required, and that it went on to the land by gravitation. There were certain reasons why, to his mind, the sewage should be utilized in that way. To begin with, the land at Beddington, formerly as agricultural land, was worth 20*s.* an acre. That was its agricultural value when the local Board first had possession of it. Since that time its value, agriculturally, had been assessed by the local authorities at £9 an acre! It was true that assessment had been appealed against, and he believed it had been reduced somewhat, but it showed what sewage would do to increase the value of land. Sewage had been utilized upon that land now for 26 years, more or less. Portions of it had been under irrigation for that time, and the land at that very moment was known to many present, and especially he knew it was known to their respected president, to be as capable of dealing with sewage as it was when it was first used for the purpose. All the sewage of some 30,000, who had now increased to more than 60,000, had been utilized upon that land for many years, and it was still as capable of doing its work as it was when it was first used.

That fact no doubt would come with some surprise to the minds of individuals who had been in the habit of thinking that land became "sick" of sewage. Land would become so, though a sewage farm was not a marsh or bog, it was true, if sewage was allowed to go upon it in certain ways, and if no produce was taken off; and that latter point was what he wanted especially to bear upon. If the quantity of sewage put on corresponded with the quantity of produce which was taken off the land, they would have a continuance of purifying power of the earth and an ability to deal with the sewage in the most perfect manner possible. He could point to the results at Beddington to prove that. But what had happened at Beddington? Land, which had been comparatively poor and worth, as he had mentioned, £1 an acre, had, since the authorities of Croydon took it, risen wonderfully in value. The owners of it had been paid various prices of £200 and £300 an acre for it, and the whole of the money for the purpose of purchasing that farm had been raised by the parish of Croydon, and it had been used in the way he had mentioned. Yet, if they went through the accounts of the local Board of Health and of the corporation of Croydon from the first foundation of the farm to the present time, they would find that it had never cost more than 2*d.* in the £ upon the rates of the parish. They had utilized the sewage of Croydon in that way, and the effluent that had gone off from the farm, when analyzed, has been found always sufficient to meet the requirements of the Rivers Pollution Commissioners; indeed, on many occasions it had been found to be as pure as the water of the Thames before being filtered for the people of London to drink. The fact was that the land was capable of taking out the whole of the mischievous matters that existed in sewage, of utilizing them, and of sending them back into the town and into the country in the form of food fit for the peoples' use. What was the nature of the food which had been produced at the farm, or which ought to have been produced there? It ought to have been in accordance with the materials that had been put upon it. That was, that the sewage which we sent on to the farm contained a certain amount of material that was derived from the people of Croydon. There was, in round numbers—he was calculating upon the numbers

as they existed at the present time rather than when he had more to do with the management of the farm than he had now —in round numbers there was the sewage of 66,000 utilized at Beddington. That was the quantity which was provided from the town and district of Croydon. There was also 30 gallons of water per head per day, which was pumped by the authorities—a waste of one half. That was the sewage of 66,000 people. It might be fairly asked what had been the result of inquiries with regard to the value of that sewage? There had recently been a demonstration at the Society of Arts by a very eminent man, Dr. Tidy, who dealt with the question and who had valued human sewage at from 8*s.* 6*d.* to 9*s.* per head. If they came to calculate what 66,000 people came to at that reckoning, they would see that, so far as the Beddington Farm was concerned, there had been no return of anything like that amount; it would be something like £25,000. When he had to do with the farm he paid a great deal of attention to the matter, and he was able to see that, so far as the utilization of sewage on certain spots was concerned, if they took an acre of it and applied to that acre in the course of a year 5000 tons of sewage, and they took off from that acre 40 tons of produce, they would probably get as near to a successful result as could be expected. He had often found that on various portions of the farm they were able to get over 40 tons, and occasionally 50 tons of produce from each acre in the course of five, six, or seven mowings of rye-grass. He was thus enabled to assess, as far as the Beddington Farm was concerned, the value of each individual at 3*s.*, and the financial proceeds from the farm at this moment ought to be £10,000 a year. That was at the estimate 3*s.* per head annually. The result of some further inquiries enabled him to see that 5*s.* per head could be obtained under the more favorable circumstances of a dryer year and a smaller rainfall, and he had, indeed, got land which repaid for every 5000 tons of sewage put upon it at the rate of 5*s.* a head. He had seen from observations made by experts in agriculture, and especially by Professor Liebig, that the manure of a sheep was valued at 5*s.* per head a year; and he took it that the excreta from a human being ought to be something approaching in value to that of a sheep. Supposing, then, that they were equal in value to 66,000 sheep,

and they proposed to throw the manure into the sea instead of utilizing it, they would be looked upon as ridiculous asses! And yet that proposal was being made by persons who were thought to be authorities, and who told them that it would be a great deal better to throw the sewage into the sea than to utilize it as they had done at Beddington for the purpose of producing meat and milk for general use. He said "meat and milk" advisedly, because the longer he was connected with the farm the more satisfied he was that it would be wrong for them to try to produce anything else from sewage unless one had a much larger area under cultivation than was possible at Beddington; for it had been proved most conclusively that the only way they could deal with the sewage properly on narrow areas was by growing rye-grass. Rye-grass is a carnivorous plant, which has the power of dealing with sewage, and of taking out of the water all the elements it contains which might be injurious to health. It could absorb nitrogeneous and other matters, and could take out of the sewage albuminoid particles in a most marvellous manner. He had proved to his own satisfaction, as well as to that of numerous experts, that rye-grass could do that in the following way: He placed rye-grass seeds in common flower-pots, covering them with glass shades. He fed some with nothing but water, others with stinking beef-tea and putrid milk, and also with fresh beef-tea and fresh milk. The plants which were fed with water only he found grew up to a certain point and then stopped. Those that were fed with stinking beef-tea and putrid milk did not grow until a few days elapsed. They appeared to hesitate for a time, and then grew. But those that were fed with beef-tea and milk, which had not undergone any decomposition or change, began to grow immediately. Their growth was immediate and rapid. Thus he discovered that the plants that were fed with putrid beef-tea and milk did not grow in the rapid manner that the others did. That showed that plants fed with putrid sewage were a long time before they began to grow. He thus conclusively proved, to himself at any rate, that the great point in sewage farming was that the sewage should be dealt with fresh, and that the sewage produced in the town should be on the farm within five or six hours; for by utilizing it at once you

would have an advantage from the growth of the plant that would make the sewage worth four times over, in financial value, what it would be if it was put on the land 48 hours after its production, and after decomposition had set in. It was only from fresh sewage that you could obtain a financial return that would be satisfactory; and on the other hand, if you allowed your sewage to become putrid, you would get a return which would be far from satisfactory in a financial point of view. (Hear, hear, and applause.) That was the great principle that was required to be observed in sewage farming. He had over and over again given evidence on that point before committees of the House of Lords and the House of Commons; some had ridiculed his statement that sewage did not and should not smell in its application to the purpose of sewage farming. They had ridiculed his statement, and had thought that it was an absolutely necessary contingency that sewage should stink. But when sewage began to stink, it was losing its financial and agricultural value; and the great object that sewage farmers should have, should be to get sewage on fresh, and before decomposition took place. Professor Liebig at first misunderstood that question; he thought that decomposition was requisite, and he looked upon it—as other chemists do still—that it was requisite that all manures should be reduced to their first elements before they could be absorbed by growing plants. Plants, as was known, live upon plants; they are cannibals so far as their food is concerned; they live upon one another; but before a plant could appropriate another plant it is requisite for that plant to be broken up by putrefaction. It was no use manuring a plant with fresh straw or chaff, it would not flourish under that kind of treatment; but the straw must undergo putrefaction. Liebig had an idea that animal matters must undergo putrefaction also; but that was a great mistake. It had been shown that there were plants capable of dealing with insects before decomposition set in. Certain carnivorous plants could catch and absorb live insects within a few hours. The leaves of the common sundew caught live insects within their folds and absorbed them without those insects undergoing putrefaction; rye-grass had the same power. Rye-grass could deal with the albuminoid matters that were found in sewage at once, and it

obtained very much more nourishment from them through there not being any of the waste which would arise if the organic matters were reduced to the condition of ammonia, or of that of nitrates and nitrites. The necessity of having the sewage fresh was manifest, and it showed itself in two or three ways. There would be no waste of power in having to bring back inorganic salts into organized materials. The character of the material that was got from the farm would be much more luxuriant if the sewage was fresh than if it was putrid. There was another advantage belonging to it. Not only was it advantageous financially to have fresh sewage, but it was advantageous in point of health ; and that, he considered, was the most important point of all in connection with sewage farming. All knew that among the 66,000 people living in the parish of Croydon there were always sure to be every now and then some cases of fever, measles, small-pox, etc., which might be propagated by their excreta contained in the sewage. Now, it might be considered a most extraordinary thing, but no diseases of any kind had ever been propagated from the Beddington Farm, and he meant this observation to apply to Norwood as well. He had watched with the greatest interest and the greatest desire to learn whether anything of the sort did take place, because the future of sanitation depended upon correct observation on this point, but not one single case had ever been brought to his notice which had been proved to emanate from the farm ; neither had any proof ever been obtained from the 300 farms which already existed in the country. When we come to think it over, we should find that there was a special reason why enthetic diseases were not propagated. It consisted in this fact, which he could best illustrate by the following example : If you went into a malting-house and saw the barley there undergoing the process of malting, you would know that until the barley had reached a certain heat there would be no growth, and that if you kept it chilled the barley would not sprout for a certain length of time, and increased temperature was required. This was provided in the barley by chemical changes, which raised the temperature of the seed itself ; when the sewage went down to the farm it carried the disease germs with it, and when it arrived on the farm it was at a much lower temperature than that

required for the germs to grow in. They went down as eggs —he did not mean that they were round eggs with shells—but they had gone down in a form corresponding to eggs, but that they were not hatched. A certain time was required for those eggs to hatch, as well as a rise of temperature, and if you could get them on the farm before they were hatched the germs would be killed. A physical process would be set up antagonistic to the hatching process, because they would come in contact with the rootlets of the rye-grass, which would at once digest them. It was a wonderful study to see how the rye-grass took albuminoid and other organic matter out of the sewage, and cleared it off. It consumed it like the carnivorous plants did flies, or sea anemones did organic matter in sea-water. Rye-grass ate the disease germs, and utilized them for producing the luxuriant growth which Mr. Horsley (the farm manager) was able to show. If, however, upon any field of rye-grass under sewage rye-grass was not growing, we are not defenceless. Sewage would come in contact with the earth, and nature had provided a remedy for the purpose of abstracting the mischievous germs which enteric diseases produced, and which might otherwise be propagated by sewage. The best way to deal with such things was to bring them as quickly as he could to the earth, for the soil would alter their chemical character at once, in the same sort of way that the dyer's chemical acted upon colors; it would unite with the organic matter in the sewage, by which they became one body. It was known to every old woman in the country that if a cat misbehaved itself in the house all she had to do was to run out and bring in a little earth in a shovel and scatter it upon the offensive matter, and the smell would be gone at once; and if animal excrete are mixed with water the smell soon subsides. That was precisely the case with the sewage. The smell would go immediately if you put it properly on the earth, and hence the necessity for putting sewage on the land fresh before putrefactive change could arise. In every gallon of sewage there was proved to be on the average 45 grains of material in solution, and 44 grains held in suspension. Now, that suspended matter was one of the difficulties that was being dealt with, or, rather, was being tried to be dealt with, by chemists, who wanted to take it off. It was very curious

that in the suspended matter and in the solids of sewage there was comparatively very little value. Taking a sheep as worth 5*s.* a year for its manure, it would be found that, so far as its dung was concerned, it would not be worth 9*d.* It was the liquids that were valuable ; and so it was with human beings : it was the part held in solution that was the real value, and not the solids. Various measures for dealing with the solids had been tried. Settling tanks and other devices had been tried, but they were all to his mind abominations, for if the solids were utilized properly, there was no necessity for anything of the kind. If the land was properly cultivated, it would appropriate all such matters, and would deal with them advantageously ; but it was necessary that the farming operations should be in accord with the character of the material used, and it must be broken up very often. The sludge, as he might call it, which was abstracted from the sewage, was found to be utterly worthless. There was at the present moment an advertisement in the papers for tenders to take so many thousand tons of it and throw it into the sea from the sewage of London. But many believed that there was a value in it, and that some day it would be found to grow things that perhaps were not now grown in the country. When he had had to do with the farm it had been his intention to have tried certain plants with the sludge. He had intended to have plotted out and grown seeds of all kinds obtained from other countries in temperate latitudes upon the sludge, and to have found what would grow upon it and what would not, for his impression was that there was something in vegetation which would be able to use up the sludge, and—as had been found, apparently by accident, that the best manure for hops was rotten rags—we would be able to find what was the best material for producing some particular plants. Whether it would be found so or not he could not say, but it was the idea he had got into his mind, and he had hoped that by sowing various plants on a square yard or two of ground covered with the sludge to have discovered the plant. There was another thing to be considered in utilizing sewage, and that was that it should go on to the ground intermittently. He had heard and seen, though not recently, but he had seen fields of ten or twelve acres under sewage for ten or twelve

days, and even for several weeks together. Nothing could be more disadvantageous and destructive to financial success than to allow sewage to go on to a field in that way. To properly utilize sewage it was necessary, not only that the albuminoid matter should be taken out of it, but that atmospheric influences should deal with it when plant growth was not rapid. If you keep your soil water-logged by sewage for three or four days, you would diminish its power to appropriate organic matter. Sewage should be allowed to go on one plot of land for 12 hours, and then it should be turned off into another plot, and the first plot should be allowed to get moderately dry before other sewage went there. This allowed the air to get into the soil. The interstices should be allowed to get empty of water, and organic matter would then be left behind. It would be found afterward that the air would have a chemical agency which would materially assist the plants in their growth. Without those times for drying it was impossible for a sewage farm to be successful. One of the difficulties in connection with the matter was that the more retentive the soil was, the more frequently must it be allowed to dry; and a clay soil required to be changed from plot to plot more frequently than the soil at Beddington. But still you must have your intermissions; if you did not it would be utterly impossible for a farm to be worked to advantage financially, and so get your return of 5*s.* per head from the population whose sewage was utilized, and ultimately it would become difficult to purify the water properly, and your effluent would not be the high standing that it was capable of being brought to if the land was treated properly. He had mentioned that rye-grass had been found to be the most advantageous of all growths, and he would add that it was requisite to have rye-grass grown in accordance with the number of people for which the farm was created. If you had a farm where you could not utilize all the rye-grass that was there, you would get into difficulties either financially or in point of health, or in both. You would get your land choked with sewage, and you would have mischiefs arise from some causes or other which ought not to exist, and render you liable to stoppage by injunction in the courts of law. It was requisite, therefore, that you should get a sufficient amount of rye-grass. If you did not you would sooner

or later get into many difficulties. Two years ago there were only 136 acres of rye-grass on the farm, and that quantity, considering it had to take the sewage of 50,000 or 60,000 people, it was quite certain was not sufficient for the purpose, and even then the manager complained that he had more food than he had stock to consume it. If the cultivation of such a large amount of rye-grass was necessary, of course it entailed the provision of a large amount of stock for its consumption, if there was to be a good financial return. He recollected on one occasion soon after he had retired from the Board, the manager asked him what was to be done with the grass? There was no cattle to eat it, and no sale for it. "Well," he replied, "you must cut it, throw into heaps, and let it rot." The manager went to the committee and recommended that certain fields ought to be cut, and the committee said: "What, waste 15*s.* an acre for mowing, and then throw the produce into manure heaps! No; let it make hay, or do anything but that." But rye-grass is a biennial plant, and if you cut it will last some time, but if you let it flower you will destroy it for next year's growth. However, on the occasion he was referring to the fields were allowed to go into flower, the 15*s.* an acre that would have been paid for mowing was saved, but the whole of the crop was destroyed next year, and a rental of £10 per acre and rates in proportion were paid for nothing at all. Hence the great point with regard to rye-grass cultivation was that before it got into flower it should be cut, so as to stop the maturing of the plant itself; and you would find that you could cut rye-grass five, six, or seven times a year, and that the oftener you cut it the better it effected its purpose as a sewage purifier. Yet, if you let it go into flower, you destroy it for the next year's growth, and when you went to look over your field you would find only water-grasses, because the greater part of the rye-grass would have perished. Water grasses could not deal with the sewage, and that was proved by the fact that it was utterly impossible to get forty or fifty tons of produce off an acre of it; you must take that amount of produce off to keep the sewaged land in good order. The next question which arises is, what were you going to do with your produce, 12,000 tons of rye-grass from the 300 acres, more or less, which ought to be under cultiva-

tion? Well, it did seem most extraordinary that the produce of a farm of 600 acres should not be able to be disposed of by a population of 66,000 close at hand, and a population of 3,000,000 and 4,000,000 within a few miles. It had been found that so long as the supply was kept up the demand grew also, and in one year Mr. Horsley, the manager, took as much as £2647 in ready money for the sale of grass from the farm. That sum was paid by the cow-keepers coming from a distance. It had then struck him (Mr. Horsley) that, instead of having cow-keepers coming three, four, and five miles to fetch loads of grass from the farm, it would be much more reasonable to have the cows close to the grass, and to take the milk from them, instead of having the grass taken away to produce milk three or four miles away at a considerable cost for carriage. The carriage of milk was very much less than that of tons of grass, therefore he had urged that the farm authorities should endeavor to keep cows themselves, and so save the cartage of the grass. They were upon that scheme when he had to give up office, and he then found that the two points that he had been expressly following—namely, the production of milk and the production of meat, were the two points that were not to be carried out on any account whatever. It appeared as if because he had supported them, therefore they were to be opposed as wrong. Still, it did seem to him that, having got the produce, it was a great deal more reasonable to consume it at the farm than to have it carted away to be consumed elsewhere. If it paid cow-keepers to fetch it three or four miles, it must certainly be more profitable to consume it on the spot. There was much opposition to that course, and there were some reasons for it. It was said to be very unsatisfactory to have such large money transactions taking place by agents over whom you had not a perfect control. But he had replied thus: "Every large farmer has his bailiff, and if you cannot trust your bailiff and steward, change him and get some one whom you can.

"You ought to deal in this way, because until you have proved to the world that sewage farming can be carried on successfully in a financial point of view, it is utterly impossible to get a tenant to take the farm." His object was to get a tenant to take the farm, but before he could do that he would

have to prove conclusively that it could be successfully farmed at a profit, and also to show what that profit probably would be if farmed by a man who had his own capital in it. It appeared to him that the only way to do that was to use up all the materials on the spot by producing as much meat and as much milk as they possibly could; but, unfortunately, the Farm Committee, for some inscrutable reason unknown to him "or any other fellow," had set their faces against cow-keeping. Still, there was one of the most magnificent collections of animals in the country kept close by, which were now fed by the rye-grass from the farm, and the owner of them was doing in a private way that which the local Board refused to do, but which the Council, acknowledging their incapacity to farm the land, concluded that they could not do. Still, it was done, and he did not care who did it so long as it was done in a manner that was highly satisfactory; and it certainly was now done in a manner that was extremely satisfactory in many ways, for the private establishment was conducted as cow-keeping should be; the cows were kept as clean as gentlemen's horses, and the milk produce was of the highest order. The question of milk was one to which he had given a great deal of attention when he was on the farm. On one occasion some officers came down from Somerset House and took away 24 specimens of milk from 24 cows to analyze. The officers saw the milk taken from the cows and sealed it up and carried it away themselves. He subsequently had the analysis, and nothing could have been more satisfactory. Out of the whole number there was only one analysis below the average, and how that came about he was unable to determine; but it was very considerably lower than the rest. There was only that one, and his impression was that there was some mistake about it. The whole of the other milk specimens were shown to be considerably above the average with regard to the fatty matters. The result of the analysis had been published in *Bell's Weekly Messenger*, and it showed conclusively that, so far as the milk was concerned, it was of a highly satisfactory character; and he believed, too, that it had been proved to be so over and over again in milk taken from cows fed with sewage-grown grass. If a tenant had the farm, he would not allow such a state of things to exist as that which was con-

tinually reported to the Council from the Farm Committee about having a great deal more feed than could be possibly utilized. A tenant would at once buy more stock, he would turn the feed into meat and milk, and thence into money. That appeared to him to be the real object of farming; to say that it was not profitable, to say that it was not to be carried out because it was not profitable, was to say that sewage farming was not profitable, and that it should be abolished. This appeared to be the object which some of our local legislators seemed to have in view. What would be the result? Instead of paying *2d.* in the £ you would have to pay *1s.*; that was provided you went into the West Kent or some other similar scheme. (Hear, hear.) It would not be a question of *1d.* or *2d.* in the £, but it would be a *1s.* in the £ over the whole area, and you would then have the sewage thrown into the sea, for no real purpose except to increase the impoverishment of the agricultural interest; and instead of the wonderful results that were shown at Beddington, you would have nothing to show for it whatever. It did appear to him that one great point, so far as Beddington was concerned, was, that there never had been proved against it a single case of injury to the public health; although the sewage of 66,000 people had been dealt with and had been disposed of, more or less, for many years, the health of the district was very good. The farm had cost the parish comparatively nothing, for a *2d.* rate was nothing compared with what would have to be expended on chemicals; it had saved a great deal, though it had not been managed always as it should have been; because new committee men always had to earn their experience, and would not be guided by those who had studied the subject before they came on the scene, and would not accept the experience of those who had gone before them. A man when he was first put on it often thought that he knew all about it (laughter); but really it was the most delicate and intricate piece of scientific work that any farmer could have. Another thing he would like to remark upon was, that you cannot have the same rye-grass always in perfection. When the plants are beginning to get worn out the land should be broken up; and that was one point on which the Farm Committee had acted very wrongly and very antagonistic to the financial interests of the farm;

they had not broken up the land when it was necessary. Mangels could then be grown upon it; Mr. Horlsey had been able to produce 40 tons of that root crop to the acre. He had seen them left too long before the plant was sown, or they were left too long in the field before they were clamped. If you grew them in a proper way you would get your 40 tons, and you would in doing so take out something that the rye-grass had left behind; but you must not sewage your root crops as you sewage your rye-grass or your fallow land. What was the next step? It would be to take off a crop of cereals, such as oats, or something of that nature, and not go immediately back to rye-grass, so as to let the land have a perfect rest. It was known that oats grew wonderfully well at Beddington, and you might get, under certain conditions, wheat of the most admirable character. Financially, cereals were not satisfactory, but they were required to keep the soil in order. But cereals must not be sewaged. He had had a party on one occasion, and had purchased of the Farm Committee a couple of bushels of corn, which he had ground into flour and made into bread for his visitors, and they were delighted with the bread, which was as good as the very best English wheat could produce. That was the course that should be taken in utilizing the Sewage Farm, so as not to grow rye-grass on it always. You must, too, have somebody to consume and take away the produce. If you could not get people to come and take it, you must have stock to consume it. That stock might be partly young stock and partly cows, so as to provide meat and milk. Close to us was a market that would take any amount of milk or meat, and to produce those things appeared to him the right way of dealing with the farm. Market gardening had been tried by a very skilful hand, but it had been found that financially it failed. The large amount that had to be paid for labor in connection with it, for the growth of weeds is most extraordinarily luxuriant, and the dependence upon the season, and the necessity of being in the market first if you wanted your prices to be satisfactory, proved that market gardening was not so advantageous as was a crop of rye-grass, followed by mangels or cabbages, and then cereals. That result had been arrived at from experience of more than twenty years' growth, and he

was satisfied that it would be a very unwise thing under any circumstances to go back to market gardening at Beddington; whatever might have been the case, if the sewage had been delivered on to the downs above Croydon, as he had once advised should be done. He said that advisedly, because he understood that there had been, or was to be, an attempt to put a large portion of the ground to market-gardening again. It would be a complete mistake if it was done, just as great a mistake as had been made in planting osiers upon a portion of the land. There was one other important point which he must mention with regard to the farm, for he was most anxious about it. An open sewer had been laid down, which connected the farm with the filter works, and it was becoming a danger to the inhabitants of Croydon. In that open sewer, which every year became larger, deposits were being made, and it was acting as a kind of reservoir. It was damming back upon the town of Croydon the sewage which ought to be on the farm, so giving time for decomposition and decrease in financial value. Sewage used to go on to the farm while fresh, but he found that now there were odors arising which ought not to have any existence. At that point, also, a couple of settling tanks were provided, for what object he could not conceive, except to deprive the sewage of its utilizing power by giving rise to fermentation and the production of heaps of sludge, which were now being collected and deposited at that spot in a great heap, which would be sooner or later a serious injury to the neighborhood. That part of the farm must be altered, the tanks ought to be removed or at least rendered inocuous, because he was satisfied that if the condition continued and we had cholera in the country, cholera would be found to be developed and connected with it, as certain as he stood there. He said that because he knew that if such a condition did arise, there would be an outcry raised against sewage farming on account of a condition which was no part of it, but which was actually antagonistic to it. It was a mistake to have it there, and if it was found that eight or ten persons died of cholera there would be an outcry against the farm, raised by ignorant persons or those who were interested in other ways of dealing with sewage, which was unfortunately too often at the bottom of the evils he com-

plained of. There was another point. He saw in the report of the manager that he complained that every time there was a heavy storm of rain the fields became flooded with sludge from the town drains. At the very time that that report was sent in there were serious complaints of smells from sewer gratings. Of course, that showed that the town sewers were not cleaned properly, and when a heavy rain came the fields were flooded with useless sludge, which ought not to have been left in the sewers. Instead of removing the evil it was allowed to go on, and the Council had put up stink pipes to carry off the smell, instead of turning their attention to the removal of the cause. He had no objection to the erection of the ventilators, but to leave the mischief, to leave the sewers as they were, containing mischievous material and depriving the farm of a great deal of its proper nourishment, was wrong. The sewers in many parts of the town were defectively constructed, and were sewers of deposit. It was injurious, too, to the health of the people to leave the deposits in those sewers. Those temporary shifts were very well, but the sewers ought to be so constructed that they could be flushed clean; they should, in fact, be self-cleansing. It was a matter of careful engineering and levelling. Stinking sewers ought not to be allowed to continue if we wished to escape from those evils which would sooner or later come upon us if they were left as at present. The last point to which time would on this occasion allow him to refer was as to the rainfall. All the rainfall could not be kept off the farm, but the quantity of sewage that was put on the land was only about double or treble that of the rainfall. The amount of rainfall averaged 25 inches, and if 5000 tons was applied to each acre of land you would only apply a quantity of water equal to double the rainfall. There were large portions of this country where 75 inches of rain fell, and by putting 5000 tons of sewage on the land it was not greater than it was in some of the counties, such as Westmoreland. Westmoreland is a very healthy district, and the large rainfall there makes no difference. On the other hand, there were countries in which there was no rainfall at all, and where there were floods instead, such as in Egypt; it made no difference to the general health or to the soil. So that there was nothing which was done on a sewage

farm which had not its parallel in natural history. He considered sewage farming was the proper way to deal with the sewage of the country, and it was most unwise to ignore it. We were calling out for meat and importing it from abroad, and the larger portion of our population was deprived of milk (for there were numbers who did not get it because the quantity produced is utterly inadequate to supply the requirements). We should be doing all we could in many parts of the country to promote the development of sewage farming. It would help to diminish poverty, since it would give employment to a very large number of people, because on an agricultural farm where originally some seven or eight persons only were at work, 70 or 80 would be employed when it was turned into a sewage farm. Labor would thus be multiplied ten times over in the neighborhood of every large town, and large quantities of food, both animal and vegetable, would be provided for the people. It did appear to him to be of imperative consequence that we should develop such farms, and develop them for the purpose of providing food for the people, which we now have to import from abroad, when we could have produced it close to us if we only used our advantages aright.

THE UTILIZATION OF GARBAGE.

By THOMAS D. MCELHENIE.

THE apparent purpose of chemistry, so often realized in the last thirty or forty years, is that nothing shall be wasted ; but the solution of the vexed question, "What to do with garbage?" appears thus far to have escaped the notice of the chemists. The very best disposition of it would be for every family to burn their own in the kitchen fire, but there are many housekeepers who object to this. They say it causes unpleasant odors through the house. The writer is unable to confirm this after ten years' experience. The odor, if any, goes up the chimney, as all bad odors should. But the fact remains that in cities there will always be great numbers of housekeepers who want such work done for them at public expense. The cremation of garbage is just now attracting

attention. This would be excellent as compared with converting it into unwholesome meat and milk; but there would be nothing recovered except the ash, which might have some slight value for fertilizing. The writer has for some months been considering a plan for destructive distillation of garbage, which for the purposes of this article is understood to mean waste food products, animal and vegetable.

An outline sketch of a plan for the purpose is herewith submitted. It may be premised that it is as much the duty of cities to disinfect the sewers as to clean the streets or extinguish fires; therefore, as this will involve only a small extra expense, let the necessary works be erected near the head of one of the sewers and lay a pipe—say six-inch—from the sewer to the grating of the furnace, which should be inclosed in such a way that the draught for the fire would come from the sewer instead of the surrounding air. Having a high chimney to secure free combustion, this would withdraw the sewer gas and render it innoxious by burning.

Let me say in passing that it would be worth while for the authorities of a city having sewers and factories with high chimneys to connect them in this way to aid thus far in disinfection.

Having our pipe in place, the plan of operation should be about as follows:

1. As there is always more or less melted grease and greasy water in the barrels, dump the contents into bins having a slanting grooved bottom and a gutter at one side by which the liquid portions should be conducted to a vat for treatment.

2. When the garbage has drained, transfer it to a cylinder or cylinders of boiler iron erected over the furnace; apply heat, and through a faucet at the bottom draw off the further accumulation of melted grease.

3. When this is about done introduce a quantity of quicklime, which, in contact with the organic matter, will generate gaseous ammonia. This should be washed and collected in the usual way, and may be purified and concentrated by a subsequent distillation, heating by a steam coil.

4. When ammonia gas is no longer evolved and as the mass acquires a higher temperature, becoming carbonized, the evolution of illuminating gas will begin. This should be conducted through a washer into a suitable receiver.

5. When this is finished there will remain in the cylinder or retort a coke, which can probably be used as fuel for further operations.

6. The ash from this might possibly contain enough potash to pay for lixiviation. This could readily be determined by analysis.

7. The melted grease and greasy water should be pumped into a boiling pan placed over the fire, boiled, strained off, and allowed to cool. Then collect the solid fat and purify by boiling and cooling again with clean water once or twice, and finally utilize in making axle grease or some other commercial way that should insure that it would never touch the human skin. I believe the plan here outlined would be feasible, and by some aid from the city would in time yield a profit. It would not be difficult to prepare working designs for the necessary plant, and by hiring some idle factory the experiment could be tried on a practical scale for a thousand dollars or less.

SHOULD DWELLING-HOUSES BE PLUMBED?

WE clip the following from the *Metal Worker* of September 15th, and invite every reader's attention to the excellent remarks of Mr. Bayles:

A few days ago the following letter was printed in the *Evening Post*, of this city, under the heading "The Danger of 'Sanitary Plumbing:'"

To the Editor of the Evening Post:

SIR: The science of plumbing is not an exact science. Experts disagree both in system and workmanship as to good or sanitary plumbing. All "practical plumbers" advise and are ready to execute in the most intricate and expensive manner the introduction of the insidious deadly poison of sewer gas into the bedrooms or the adjoining closets of every man's house, placing between the family and sickness or death a half teacupful of water in a trap. Professional medical experts have said that water in a waste-pipe trap changed every two hours will not permit the passage of sewer gas. If

this is true, then one's little children, put to bed at 8 P.M. in a bedroom handsomely fitted with hot and cold water, silver faucets, and decorated porcelain, will commence at 10 o'clock to breathe the foul gases generated by sewer filth, and continue to do so for the next eight hours.

But the fact probably is that water will not at any time prevent the steady flow of sewer gas. Sewer gas rises, expands, presses; it constantly generates, and must have space, and so far as all appliances yet known to the plumbing trade under the head of sanitary plumbing, as back air or direct ventilation, go, no absolutely safe plan has yet been devised by which water and waste can be introduced into any bedroom or adjoining closet and the health of its inmates be unimpaired. If weekly deaths from low, slow, intermittent, and high-class fevers, diarrhœas, diphtheria, etc., could be gathered and classed under the one head of sewer-gas diseases, we should have some idea of the fatal effects of sewer gas; but the lingering, desponding existence that is led by those able to combat with the deadly effects of sewer gas, and who are treated under the general name of malaria, is scarcely known outside their friends. Let us have good, plain, old-fashioned English to express health and death, and say: "Sick from breathing bad air," or "Dead by sewer gas."

I have lately overhauled a fine house on the west side, said to have been "the best plumbed house in New York," done by experts, and approved by another, who chalked his name on the ventilating-pipe. The lead was heavy, the joints beautifully "wiped," the silver faucets and marble basins all that could be wished for, and where the pipes were too long they were coiled around under the floor, and thus increased the plumber's bill. The kitchen sink and the washtubs were separately trapped, but the five open marble basins and bath in and adjoining the five bedrooms were all without traps, and with no direct or indirect ventilation. There are four chimneys in the house, and every bedroom fireplace—in fact, every fireplace in the house, but one in the dining-room—had been sealed up and adapted to a furnace register. The waste-pipes from five basins and one bath, when gathered together in one, passed into a 6-inch iron soil-pipe in the cellar, and here, at an average distance of 60 feet from basins and bath,

was a single unventilated pint-of-water trap, which was probably syphoned every hour of the day. Sewer gas permeated the bedrooms, and when completely closed for 24 hours they were filled with a sickening odor.

There is one and only one remedy for this: Strip your bedrooms of all plumbing whatever; let no sewer connection of any kind come into a sleeping-room; go back to the clean, old-fashioned bowl and pitcher, and be content with good health. A house to-day that has the best sanitary plumbing is one that has the least possible amount of plumbing in it. Bath-rooms and water-closets should be in separate rooms, supplied with the best-known ventilating traps and with direct open-shaft ventilation in addition to pipe ventilation through the roof. The best sanitary plumbing I know of is where the whole of it is put into another building entirely detached from the dwelling-house, and this has been done by an old New York builder in his own home after a long experience with the inexact science of plumbing. ARCHITECT.

To the above the editor of the *Metal Worker* replied as follows, his letter being published in a later issue of the *Post*:

To the Editor of the Evening Post:

SIR: Will you permit me to correct in your columns the misconceptions of your correspondent, "Architect," whose letter on "The Danger of Sanitary Plumbing" appeared in your issue of the 8th inst.? Its statements are misleading, and show an ignorance of which the author, if really an architect, has good reason to be ashamed. It is because so large a proportion of those engaged in practice as architects are ignorant of the first principles of the mechanics of hygiene that so much bad plumbing-work is done in dwellings and public buildings. There are very few architects who can plan a job of plumbing-work and write the specifications for it correctly. Some of those who have gained a reputation in this line employ practical plumbers to prepare their specifications. As a rule, however, the architects prefer to do this part of their work in the usual perfunctory way, with the result that it is rarely possible to carry out their plans in practice or work to their specifications. Out of many hundreds of plans and

specifications for plumbing-work which I have had opportunity of examining, I have not seen a dozen which were practicable and correct except those prepared by sanitary engineers or practical plumbers. In their knowledge of conditions affecting the healthfulness of dwellings the plumbers have been wiser than the architects for at least a quarter of a century, and perhaps longer.

Your correspondent, having made the discovery that plumbing-work in which all the conditions of safety are omitted is liable to introduce bad air into a house, makes the mistake which the late Dr. Frank Hamilton and others have made before him, and urges that all the plumbing conveniences of the modern house should be banished, since the healthfulness of a dwelling is in inverse ratio to the number of fixtures and lengths of pipe it contains. He commends as the best practice he has seen the entirely impracticable plan of putting all the fixtures in a separate and detached building—an English idea, which has been for many years taught in the doctrinaire school of sanitary science. In my judgment the general distribution of hot and cold water through a house, with baths and closets as numerous and convenient of access as the purse of the owner will afford and the architectural arrangement permit, is in the largest degree conducive to comfortable living; and the person who cuts himself off from the enjoyment of these luxuries shows a degree of intelligence comparable to that of the man who should refuse to have fires in winter because the gaseous products of combustion are deleterious to health. The sensible man expects these products to go up his chimneys and find an outlet in the upper air. If disappointed in this he would conclude that something was wrong with his flues, and not that his life and health demanded that he should abolish furnace and fireplaces and get along without artificial heat.

It is not true that among those entitled to recognition as experts in the mechanics of hygiene there are any important differences of opinion as to the methods of securing immunity from the dangers incident to bad plumbing-work. There are no mysteries in plumbing which an architect of average intelligence could not fathom in 10 days, if willing to take counsel of those who know more than he does. One who follows the

lead and heeds the teachings of agnostics, quacks, and cranks in any line of thought or investigation may easily become confused; but because there are some who claim a wisdom above what is written, the sensible man has no occasion to doubt the truth established by human experience. The facts as regards plumbing-work are that, where it is properly done in accordance with the accepted rules of good modern practice, as many fixtures as convenience demands may be employed with entire immunity from any evils incident to their presence in a dwelling. When it is not properly done the danger is in proportion to the seriousness of the mistakes in plan and execution. The same is true of furnace heating and of a thousand other things. The inside of a pipe should be like the inside of a chimney—a channel for what is intended to pass through it, and one from which nothing escapes, except where it is intended to be discharged. Not only is this possible, but it is attained easily and cheaply, and by methods with which all concerned—except possibly the architects—are familiar.

With good plumbing we should have good ventilation; so, for that matter, should we have it with no plumbing at all, and still more with bad plumbing. A close sleeping-room full of stagnant air is likely to be unwholesome, whether it contains a set basin or the primitive bowl and pitcher. Our friend the architect seems to have forgotten that ventilation is needed at all, and the places where it is sometimes prescribed that plumbing fixtures shall be placed make even the plumber open his eyes in astonishment. It is well to look at this matter from a common-sense standpoint. We must not confound a good thing with the possible abuses incident to its unintelligent enjoyment. Health, happiness, and comfort are all promoted by the enjoyment of the conveniences which civilization has provided. Elements of danger in connection therewith are easily avoided and easily corrected, and, if our friend the "Architect" does not know how to plan anything he is sure of except a corner in which to place a stand for a bowl and pitcher, I should advise him to acquaint himself with the means by which safety in plumbing-work is easily attainable.

J. C. BAYLES.

THE ANALYST AND HIS DEEDS.

A WRITER in *Chambers's Journal* has hit off in admirable style the present furore about adulteration. The writer has a son whom he determines to make an analyst out of. The boy learns his profession and proves an unending source of trouble to the family. He is showing the slides of his microscopic outfit to his father, and among them are a section of a frog's leg and a piece of a diseased potato. The old gentleman demurs, and wants to know what practical beauty frogs' legs and diseased potatoes have.

"I can't say we do much in frogs' legs," he said, "but there are lots of things adulterated with potato. Flour and arrow-root, and butter, and cocoa, and—and—a heap of things. And the potato's just as likely to be diseased as not. It may be, anyhow, and there you are! If you don't know what diseased potato looks like, you're done."

"A pleasant lookout," I replied, "if half a dozen of the commonest articles of food are habitually adulterated."

"Bless you, that's nothing," he replied. "If that was all, there wouldn't be much harm done. There are a jolly sight worse adulterations than that. In fact, pretty nearly everything's adulterated, and some of 'em with rank poisons."

"Rank poisons! That's manslaughter!"

"Oh, no; it isn't," he calmly rejoined. "Of course they don't put in enough to kill you right off. And if you find something disagreeing with you, you can't swear what it is. It may be the nux vomica in the beer; but it's just as likely to be entozoa in the water, or copper in the last bottle of pickles. However, you're all right now. With an analyst in the family, at any rate you sha'n't be poisoned without knowing it. I'll let you know what you're eating and drinking. This fellow"—and he patted the microscope affectionately—"will tell you all about that."

And it did. From that day forth I have never enjoyed a meal, and I never expect to do so again. I have always been particular to deal at respectable establishments, and to pay a

fair price, in the hope of insuring a good article. I have, or had, a very tolerable appetite, and till that dreadful microscope came into the house I used to get a good deal of enjoyment out of life. But now all is changed. My analyst began by undermining my faith in our baker. Now, if there was one of our tradesmen in whom, more than another, I had confidence, it was the baker, who supplied what seemed to me a good, solid, satisfying article, with no nonsense about it. But one day, shortly after the conversation I have recorded, my analyst remarked at breakfast time: "We had a turn at bread yesterday at the laboratory—examined five samples, and found three of 'em adulterated. And do you know"—holding up a piece of our own bread and smelling it critically—"I rather fancy this of ours is rather dicky."

"Nonsense!" I cried, "it's very good bread—capital bread!"

"You may think so," he continued, calmly, "but you're not an analyst. I shall take a sample of this to the laboratory, and you shall have my report upon it."

"Take it, by all means. But if you find anything wrong about that bread, I'll eat my hat."

"Better not make rash promises. I'll take a good big sample, and you shall have my report on it to-night."

On his return home in the evening he began: "I've been having a go-in at your bread. It's not pure, of course; but there isn't very much the matter with it. There's a little potato and a little rice and a little alum; and with those additions it takes up a great deal more water than it ought, so you don't get your proper weight."

"Ahem!" I said, "if that's the case we'll change our baker. I'm not going to pay for a mixture of potatoes and water and call it bread. But as for alum, that's all nonsense. If they put that in we should taste it."

"Oh, no, you wouldn't. When alum is put in bread it decomposes and forms sulphate of potash, an aperient salt. It disagrees with you, of course, but you don't taste it. As for changing your baker, the next fellow you tried might be a jolly sight worse; he might put in bone dust, or plaster of Paris, or sulphate of copper. And besides, half the adulterations are in the flour already before it reaches the baker. Of

course that doesn't prevent his doing a little more on his own account."

And with that the matter dropped, so far as the bread was concerned ; but my confidence was rudely shaken.

* * * * * * *

I had again put my foot down. But it was too late. I had even forbidden my analyst, under penalty of forfeiture of his pocket money for several months to come, telling us anything whatever about the food we eat or the drink we imbibe ; but the mischief was done. I have lost my confidence in my fellow-man, and still more in my fellow-man's productions. I may try, in an imperfect way, to protect our household. I may give the strictest orders that none but the refinedest of sugar shall be admitted into our store cupboard ; but who is to answer for the man who makes the jam and the marmalade, or the other man who makes the Madeira cakes and the three-cornered tarts? And how much is there that we have not heard? I have silenced my analyst's lips, it is true ; but there is also a language of the eyes, and still more a language of the nose, and when, with a scornful tip-tilt of the latter, he says, "No, thank you," to anything, my appetite is destroyed for that meal. I can't take a pill or black draught without my disordered imagination picturing my chemist "pestling a poisoned poison" behind his counter. I can't even eat a new-laid egg or crack a nut without wondering what it is adulterated with. This is morbid, no doubt. I am quite aware that it is morbid, but I can't help it. I am like Governor Sancho in the island of Barataria : my choicest dishes are whisked away from me—or rendered nauseous, which is as bad—at the bidding of a grim being who calls himself Analytical Science. He may not know anything about it, or he may be lying ; but meanwhile he has spoiled my appetite, and the dish may go away untasted for me.

Truly, a little knowledge is a dangerous thing. The moral of my painful story is obvious. I intend to bring up the rest of my family, if possible, to occupatious involving no knowledge whatever.

EDUCATION ABROAD.

Abstract of the Report of the Commissioner of Education for 1883–84.*

Austria.—Attention is called to the new school law that took effect May 2d, 1883. The law lessens the period of obligatory school attendance, and in many respects is thought to give decided advantage to the Roman Catholic party.

Belgium.—The text of the new school law of Belgium, which received the sanction of the King in September, 1884, is presented in the report.

France.—In 1882 the number of primary schools (maternal schools excepted) in France was 75,635 ; number of teachers, 124,965 ; pupils, 5,341,211, increased during 1882–83 to 5,432,151 ; number of pupils in maternal schools, 644,384 ; number of uncertificated teachers, 26,677, decreased to 21,781 in 1883. After October, 1884, no teachers will be employed without certificates of capacity except where age and term of service are taken as an equivalent. The budget for primary, including normal, instruction amounted in 1882 to 132,314,000 francs, of which the State contributed 87,500,000 francs ; the departments, 17,500,000 francs ; the communes, 27,000,000 francs. The amount does not include appropriations for building. The condition of secondary and superior instruction in France is set forth in extracts from the proceedings of the International Conference on Education, held in London in 1884.

Prussia.—In 1882 there were 4,339,729 children in the elementary schools of Prussia, which numbered 33,040. Number of teachers, 59,917. The number of normal schools was 196, with 13,705 students ; number of high schools, 549, with 133,753 pupils and 7333 teachers ; also 3 technical high schools, with 162 professors and 1693 students. The 10 universities of Prussia reported for the winter semester of 1883–84 a total of 12,768 students.

* Education in the United States, pp. 223–248 (August number).

Saxony.—In 1884 there were in Saxony 2082 common schools, with 531,582 scholars. Comparison between 1874 and 1884 shows marked progress in all essentials of the school system. The average salary of regular teachers in 1884 was 1668 marks (about $397). The advanced schools numbered 7404, with 66,576 scholars.

England and Wales.—The number of inspected day schools in England and Wales for the year ending August 31st, 1883, was 18,540; number of certificated teachers, 37,280, with a large number of assistants and pupil teachers; accommodation for 4,670,443 scholars, or 17.35 per cent of the population; enrolled, 4,273,304; average daily attendance, 3,127,214; present on the day of inspectors' visit to their respective schools, 3,705,388; number of night schools examined, 932, with an average attendance of 28,293 pupils above 12 years of age. The 41 training colleges report an attendance of 3138 students. The total income of day and night schools was £5,829,781. The total cost of maintenance of day and night schools was £5,817,466. The annual Government grants to elementary day schools rose in the year from £2,393,394 to £2,522,541, or from 15*s.* 10½*d.* to 16*s.* 1¼*d.* per scholar in average attendance. The total cost of maintenance for each child in average attendance in public schools was £2 1*s.* 3½*d.*; in voluntary schools, £1 14*s.* 10½*d.*

Scotland.—For the year 1883 Scotland reported 3090 inspected day schools, enrolling 569,241 pupils and having an average attendance of 433,137 pupils, with 5974 certificated teachers. Number of night schools, 205, having an average attendance of 10,221 pupils above 12 years of age. Seven training colleges reported an attendance of 858. The total income of day and night schools was £906,068. The total cost of maintenance of day and night schools was £900,509. The annual Government grants to elementary day schools rose in the year from £372,901 to £384,042. The total cost of maintenance per child in average attendance was, in public schools, £2 2*s.* 1¾*d.*; in voluntary schools, £1 16*s.* 10½*d.*

Ireland.—The number of schools in Ireland under the commissioners of national education, December 31st, 1883, was 7752, attended during the year by 1,081,136 scholars, the

average daily attendance being 467,704. In these schools 7571 principal teachers were employed and 3050 assistants.

The funds at the disposal of the commissioners for the year ending March 31st, 1884, amounted to £821,553 6*s.* 8*d.* The expenditures by the commissioners for the same time were £804,891 17*s.*, leaving a balance on March 31st, 1884, of £16,661 9*s.* 8*d.*

In addition to the accounts of elementary instruction in Great Britain, the report of the commissioner presents a summary of the thirty-first report of the Science and Art Department, whose operations embrace the United Kingdom.

Greece.—The following educational statistics are for the year 1884: Universities, 1; teachers, 92; pupils, 2601; Gymnasia, 33; teachers, 252; pupils, 4117; Hellenic schools, 297; teachers, 577; pupils, 12,973; communal schools, 1717; teachers, 1898; pupils, 89,423; elementary schools, 550; pupils, 16,000; ecclesiastical schools, 5; teachers, 32; pupils, 163; private schools, 67; pupils, 16,383; polytechnic schools, 1; teachers, 22; pupils, 511.

Italy.—The Central Bureau of Statistics of Italy publishes the following educational items for 1881–82: There were 2516 infant schools, both public and private, taught by 123 men and 106 women; number of pupils, 243,972. The public and private primary schools numbered 47,220, with 1,976,135 pupils (1,053,917 boys and 922,218 girls). Evening schools for adults had 248,012 pupils; Sunday-schools, 122,107 in attendance. There were 77 higher schools for girls, with 3559 attending; 111 normal and "magistral" schools, with 8231 pupils (1319 male pupil teachers and 6912 female pupil teachers).

Netherlands.—From a very full report of the condition of education in the Netherlands it appears that on January 1st, 1883, there were 563,085 pupils in the primary day schools; the advanced schools report 13,815 pupils; the various schools for secondary instruction, 14,452 pupils; the Gymnasien and Progymnasien, 2170 pupils; the three universities, 1236 students, and the communal university at Amsterdam, 589 students and hearers.

The teaching force in the primary grades numbered 15,856

principals and assistants. The total expenditure for primary instruction in 1882 was 17,048,602 florins; for secondary instruction, 1,763,630 florins; for Gymnasien and Progymnasien, 1,829,254 florins.

Russia.—The statistical report of Russia shows that in 1883 there were 24,853 primary schools, attended by nearly 2,000,000 pupils; the expenditures amounted to nearly 8,000,000 rubles. There were also 62 normal schools, with 4423 students (3803 men and 620 women); expenditures, 1,241,991 rubles. New regulations concerning the organization of the Russian universities are to take effect in 1884–85. These provisions are fully explained in the report.

Spain.—The educational institution called the Institucion Libre de Enseñanza has attracted wide attention during the last few years. A full account of its methods and purposes is given in the report. The following is an extract from its constitution, published at the head of each number of its periodical (*Boletin de la Institucion Libre de Enseñanza*):

"The Institucion Libre de Enseñanza is entirely aloof from the spirit or interests of any special religious communion, any school of philosophy, and of any political party. It proclaims only the principle that knowledge should be free and inviolable, and consequently that there should be complete independence in searching for and imparting it, without having regard to any other authority than the conscience of the professors themselves, who alone should be responsible for their doctrines."

Switzerland.—The latest educational statistics for Switzerland were given in the commissioner's report for 1882–83. The present report contains additional information on several topics. Among these is an account of the Swiss National Exhibition held in Zürich in 1883. The Kindergarten display was a noticeable feature. Most of the schools represented are the creations of special societies, Geneva being as yet the only canton in which the Kindergarten are cantonal institutions. An interesting account is also given of the Swiss Permanent School Exhibition, established by the Canton of Berne at Berne, and aided by the Central Government. Among the objects mentioned is a desk constructed with a view of avoiding the conditions that produce myopia and scoliosis. Accord-

ing to Dr. Pfluger, Professor of Ophthalmology in Berne, for school children a table ought to be inclined exactly at an angle of 30° while the child is sitting in an erect position. To accomplish this he and Dr. Lüthi had a desk constructed which answers the purpose of tending to prevent myopia and scoliosis, and which is used with great benefit and universal satisfaction in the Gymnasium of Berne.

The back of the seat is well adapted to the flexure of the spine, its curvature having been determined after many experiments performed on children sitting in a straight position. The long-mooted question puzzling sanitarists and philanthropists as to the possibility of giving to each child a separate desk seems to be solved by this invention or modification. The price of this school furniture does not exceed $2.50.

British India.—In 1882 a special commission was appointed to inquire into the working of the existing system of public instruction in India and to suggest measures for its further extension. The report of the commissioners presents a complete survey of the empire with respect to education. The progress made since 1854 is reviewed and the condition in 1881–82 fully set forth. From the summary it appears that the number of colleges and schools, departmental aided and unaided, but inspected, thus brought under review is 87,052, attended by 2,284,608 pupils; to these may be added 25,166 private uninspected schools, with an attendance of 359,370 pupils, giving a grand total of 112,218 institutions and 2,643,978 pupils. The pupils of the public schools and colleges were distributed according to race as follows: Hindoos, 1,782,955; Mohammedans, 399,711; Sikhs, 9674; Parsees, 8299; native Christians, 47,208; Europeans and Eurasians, 1831; others, 34,930. The total expenditure on account of these public institutions was 16,110,282 rupees. The departmental returns for 1881–82, including Ajmir and British Burmah, give a total of 116,048 schools, with 2,760,080 pupils.

In considering the magnitude of the work that remains to be done, the commissioners observe that the most advanced province of India (Bombay) still fails to reach 75 per cent of its male children of the school-going age, and 98 per cent of its female children of that age. The census returns are equally conclusive in this view. The male population of

Ajmir and of the nine provinces with which the report of the commission deals exceeds 103,000,000, of whom 94,750,000 are illiterate; while of the female population, numbering about 99,700,000, no less than 99,500,000 are returned as unable to read or write.

The number of primary pupils learning English in the six larger provinces of India is stated to be 195,533.

Japan.—The following statistics of education in Japan are taken from a series of tables furnished to the office by His Excellency Count Ōki-Takatō, the Minister of Education:

Total number of schools of all grades in the empire, 31,777; total number of teachers, 96,414; whole number of students, 3,327,293; total expenditures, in yen (yen=85 cents), 1,610,700.

Dominion of Canada.—The educational reports from the Canadian provinces, as a rule, show a very satisfactory condition of the schools. In New Brunswick attendance upon the primary schools increased over that reported in 1882. The Superintendent of Education suggests a new plan for the application of the legislative grant to secondary and intermediate education.

The Superintendent of Public Education, Prince Edward's Island, believes that with few exceptions the whole population between 5 and 16 years of age is enrolled in school some portion of the school year.

The number of schools under the control of the Superintendent of Education, Quebec, is reported as 5017; number of pupils, 242,723; average attendance, 185,892; number of teachers: lay, 4945; belonging to religious orders, 1926. The total of general contributions for 1882–83 amounted to $2,809,739. Among the suggestions made by the superintendent to the Legislature, one proposes to abolish the diploma for primary and second-class schools, and to retain only the model school diplomas and those granted by normal schools. With reference to this the superintendent observes: "It is founded on an undeniable pedagogical axiom—namely, that more cultivated fitness is required to teach a primary than to teach a model school."

Mexico.—The latest educational statistics from Mexico were given in the commissioner's report for 1882–83. Additional

information upon a few general topics is found in the present report. A few years ago, while the Government institutions were enjoying the highest advantages and accomplishing excellent results, primary instruction was sadly neglected. A great awakening has taken place in this respect, and measures have been adopted for introducing the object and Kindergarten systems and otherwise improving the elementary schools. The report gives interesting particulars of the School of Arts and Trades for Women and a similar school for men.

Brazil.—No complete statistical statement of the condition of education in Brazil has been published later than 1876; nevertheless, since that date there have been great developments in public instruction, and the need of larger provision for technical instruction and of more experienced teachers in all classes of schools is recognized.

In the past year an international pedagogical exposition was organized at Rio de Janeiro, and as a result of the experiment a permanent school museum has been established at Rio de Janeiro.

Chili.—From a summary of a report on education made by the Chilian Minister of Justice, Worship, and Public Instruction to the National Congress in 1884, it appears that great activity has recently been manifested in that country in all departments of education.

The Inspector-General of Schools was commissioned by the Government to visit Europe and engage directors and teachers for the normal schools of Chili in order to introduce a systematic reform in the methods of instruction in those schools. The salaries for directors are fixed at 3000 pesos ($2736); for male teachers, at 1500 pesos ($1368); for directresses, at 2400 pesos ($2188); for assistant directresses, at 1500 pesos ($1368), and for female teachers, at 1000 pesos ($912) a year. Besides this importation of foreign teachers, students of the normal schools were sent to Europe during the year 1884 to complete their studies, under a contract to teach in primary branches for 7 years after their return.

The number of public schools at the close of 1883 was 736, with an enrolment of 70,382 and an average attendance of 49,766. The various secondary schools were attended by 4307 students in 1884. Efforts were being made to secure Euro-

pean professors for certain classes of the university, and improved apparatus, instruments, etc., had been purchased in Europe for use in the department of engineering. Two students had also been selected to pursue a 3-year course of study in Europe, the one in general and analytical chemistry, mineralogy, and geology, the other in mechanics and the construction of machines. These students will thus be qualified to teach these branches upon their return to Chili. The university library contains 7619 volumes, to which additions are being constantly made.

Hawaii.—Reports of education from Hawaii state that in 1883–84 nearly three fourths of the children of the country were being educated in the public schools and about one fourth in the private schools of the kingdom. It is estimated that two thirds of the pupils were receiving instruction in the English language. Great interest is just now manifested in industrial training.

Australasia.—Reports from Australia, New Zealand, and Tasmania show a continuance of the progress in education that has been so marked a feature of the recent history of these colonies. The cost of public education in New South Wales for 1883 was £821,852 16*s.* 3*d.* Of this sum £354,687 8*s.* 4*d.* were expended upon buildings, sites, and rents.

In New Zealand school attendance is rapidly increasing. The provision made for the education of natives and for the training of the deaf and dumb and of orphan children is a noticeable feature of the work. The Government fosters superior as well as elementary education.

AJI-AJI.

PEPPER OF PEPPERS is the meaning of this compound Quichuan word, and both word and thing are largely distributed over South America, extending from the Bibo-Bio in the south to the Atrato in the north; it is also found in the dialects of the Gran Chaco; in Aymara, in Andaqui, among the agricultural Indians of Chocó, the mining Indians of Potosi, and the Cerro de Pasco. It is the finest of all peppers—no other pepper in either hemisphere competes with

it—not the *Piper nigrum*, nor the *Capsicum baccatum*, nor the *C. fruticosum*, the *C. annuum*, nor yet the *Eugenia pimenta;* all these are varied merely in pungency, some being sharp and fiery, others caustic and stimulating, and some pricking and penetrating. But the refined and delicate aji is persuasive and enticing, of not one flavor, but many flavors; it never conceals, but, on the contrary, increases whatever of fragrance and sweetness of taste or smell it comes in contact with; while giving new zest, yet it does not interfere with the flavor of a fresh-laid egg, nor hide the fresh sea breath which lingers in a well-dressed sole. It is on the most agreeable terms with a grilled shop at breakfast, or a Spanish onion at dinner; it keeps good company with all the curries, and while it puts none out of countenance, it refines and elevates them all. The excellence of its service is most appreciated in connection with grills, fricassees, and soups, while it serves to bring out the delicate, if elementary, flavor of the strawberry, and the fathomless mysteries of the cantaloupe. On a cold winter's night a sprinkling of aji in mulled claret has been known to give great pleasure, and cause a grateful surprise to many knowing ones. One quaint little gourd filled with aji will supersede the most elaborate of cruet-stands. It is the poor bachelor's boon, the gourmand's friend and guide, and the dainty man's companion. Alack! it has recently been discovered by an eminently practical people that it has a secret property which adds to all its other properties—namely, the priceless property of defending the health of human beings who are dependent upon food under circumstances of mortal danger. If an army must encamp in a swamp, and eat its dinner in a malarious atmosphere, let the food be prepared with a generous supply of the salubrious aji, no evil shall happen. This is the priceless quality which has recently been discovered by the War Department of the United States, which has secured, so we are informed, a monopoly of all the aji which is exported from South America. No aji in these days finds its way to London, and that which we once enjoyed in the belief that it would never fail us has become nothing but a sigh and a regret. It remains to be seen whether the people who have acclimatized the cinchona trees in the Neilgherries, in Ceylon, in Jamaica, and in Fiji will allow

themselves to be deprived of their delicious and inspiriting aji.

There are two kinds of aji; but there is only one way of preparing it. The best is that which is made from the greatest variety of peppers. The pods of these are taken when fresh, stripped of their seeds, and ground into a paste of the consistence of fresh spring butter. The paste is put into a small, well-dried gourd, prepared on purpose, of the size and shape of a well-grown orange. The gourd, when thus charged, is then coated with a layer of well-tempered clay, and placed in the sun to dry, or to ripen, as the simple people who prepare it say in their own tongue. By the time when the clay is well baked the pulp or paste within has been dried into a fine yellow powder, and it is then fit for use. Many people, ignorant of this fine art of the Incas, have supposed, quite naturally, that these aji-laden gourds, with their exquisite flavor and refined taste, were some uncommon and little-known natural fruits. The other method of preparing aji is to grind the seeds with the pods, which simply adds great pungency to the pepper, and is always used in the preparation of maize or Indian corn, which is boiled in its own husk with much aji, and surpasses in flavor and pleasantness any vegetable curry of the East. The gourds of aji, when thoroughly ripe, are cleansed of their coating of clay, tied up in suitable leaves, well secured by the fibre of the aloe, and which much resemble when ready for market reeves of large onions, a dozen gourds making up one reeve of aji. The cost of these in the good old times was fifteenpence for a dozen gourds; what the price may be now is only known on the Exchange. Time was when some of the old families of the interior who had passed their lives in ignorance of railways, daily newspapers, and quotations of the state of the markets, had their own special way of preparing aji, mixing with it some delicately scented bark ground to powder, or other salutary substance known only to the reticent Indian. From such houses no visitor was ever allowed to take his departure without carrying with him a supply of the latest-made aji; no traveller went to the capital or any of the coast towns but he carried with him some of this excellent pepper as a present to the archbishop or bishop of the diocese, the ladies of Santa Rosa, or the good Fathers who once a year went long journeys to baptize the children, marry their parents, and otherwise maintain the influence and authority of the Church in the remote parts of the earth. But even this good custom is fast dying out.—*The Saturday Review.*

EDITOR'S TABLE.

THE REPORT UPON THE MUSEUM OF HYGIENE, by Medical Director Turner, on other pages of this number, is eminently worthy of the attention of every reader of THE SANITARIAN. With the origin of this institution and certain marks in its progress our readers are already familiar; but for a clear appreciation of its present status, of its advantages to the practical sanitarian, its utility to the public and its necessities for greatly extending its usefulness, this report should be not only diligently read by sanitarians, but urged upon the attention of Congress, to the intent that this magnificent beginning may speedily secure that recognition and support which it so justly merits.

THE NEW SURGEON-GENERAL OF THE U. S. ARMY, Dr. JOHN MOORE, Surgeon, and recently Assistant Medical Purveyor, *vice* Surgeon-General Robert Murray, retired, is favorably known for his efficiency in every arm of the service, which he entered June 29th, 1853, and who, consequently, brings to the duties of his new office a ripe experience and sound judgment, the best guarantee for an impartial administration. THE SANITARIAN tenders hearty congratulations to Dr. Moore on his promotion, and to the service on its good fortune in the President's choice.

THE SMALL-POX AND NEGLECT OF VACCINATION IN BROOKLYN.

The small-pox was introduced in Brooklyn by a recently arrived Polish boy in June last. The said boy was first discovered by a sanitary inspector after he was convalescent, while in search of the cause of a second case in the same vicinity reported June 26th. Tracing this, the inspector found the said Polish boy had arrived in a German ship, and June 1st he came from Castle Garden and took up his residence with his mother in a tenement-house in South Fifth Street, Thirteenth Ward. Four days thereafter he broke out with

small-pox. It was recognized by his mother, but concealed —no physician was called. The boy had never been vaccinated. The second case, which led to the discovery of the first, was the chum of a visitor to the family of the first, across an alleyway. To this first secreted case 32 cases have been clearly traced, 24 of them in the same square. The next centre was established by a case in an expressman about three miles distant, also secreted. No physician had been sent for until he was *in articulo mortis;* the physician found him dead, and reported accordingly. To this second centre 45 additional cases have been traced—79 cases to December 1st. Of the whole number, 18 have proved fatal—8 in and about the first centre, not one of whom had ever been vaccinated; 10 in and about the second centre, 9 of whom had never been vaccinated, and the one who had been was 65 years old, and had been vaccinated but once, in infancy.

Fortunately for the well-being of the public, the Health Department, with the approbation of the Mayor, has been able to avail itself of an "emergency" fund to meet the occasion, and appears to have lost no time in its effort to contend with and stamp out the epidemic. A vaccinating corps of six physicians, under the special direction of an experienced inspector, are engaged in making house-to-house visits, offering and practising free vaccination to all who will accept it. The same offer is open to all who may find it more convenient to call at the Health Department. Up to December 1st, 4290 houses, containing 10,424 families, had been visited, and 5068 persons vaccinated—2775 persons had been discovered who had never been vaccinated! This work still progresses with vigor.

All cases of small-pox are promptly isolated as soon as discovered by sending them to the small-pox hospital, if they cannot be otherwise; and pains are taken to promptly disinfect all clothing and premises in every case.

Notwithstanding, there appears to be a sufficient proportion of unvaccinated persons to keep the disease alive, probably from eight to ten per cent of the whole population; and this, unless *the people themselves* can be roused to the necessity of prompt vaccination and re-vaccination, is quite large enough to sustain a formidable epidemic. Unfortunately, there are

some people—it is sincerely hoped there are not many such in Brooklyn—so ignorant of the protective power and safety of vaccination as not only to neglect their own protection, but thereby, also, the protection of their neighbors, from one of the most loathsome and dangerous of all diseases. But small as this number is, it has had sufficient influence hitherto to prevent the enactment of a law to compel them to abstain from thus maintaining a dangerous risk to their own lives, and, anon, of poisoning and not unfrequently killing their neighbors. This they claim as a right! A right to do as they please in the matter of protecting the community from the most loathsome of all epidemic diseases; a right to involve the community in an expenditure for the suppression of an epidemic, as compared with the cost of preventing it by vaccination, which may be likened to comparing the value of dollars with cents. All that the Health Department can do under the circumstances is, in addition to the proper care of the sick and their surroundings, to *offer and urge* vaccination and re-vaccination of the whole community, and rely upon the intelligence of the people to accept it. In this the public press can greatly aid.

The danger of introducing other diseases with the vaccina is a chimera kept before the weak-minded by certain cranks for the sake of a following. The truth is, after admitting all the possibilities of inoculable diseases, no *two* are simultaneously transmissible; and of many millions of vaccinations, the evidence of the introduction of other diseases with or by lymph taken from a vaccine vesicle is so small and uncertain, when compared with its protective power against small-pox, and *even other diseases*, that it is rejected by all competent observers as of no weight. But even this prejudice is overcome by the exclusive use of *bovine* lymph, cultivated in and taken from healthy calves not liable to the diseases or "blood poisons," which are the life of cranks and quacks.

Vaccination thus carefully practised is not only effective for the prevention of small-pox, but, in a measure, of other diseases—chicken-pox, measles, and scarlet-fever—and scrofulous diseases of every kind are much more prevalent and severe among unvaccinated people than among those who are vaccinated.

With regard to the necessity of re-vaccination, it will suffice to state that out of any number of adult persons who have *good marks* of vaccination 40½ per cent are perfectly protected, while 59½ per cent are susceptible to varioloid, or to vaccination to such a degree as to render their protection complete. Out of any number of adult persons with *imperfect* marks of vaccination 23 per cent only are protected, while 77 per cent are liable to small-pox or varioloid, and consequently susceptible to the protective power of vaccination.

The liability to varioloid after ten years of age of persons vaccinated under three years of age demonstrates that, generally, protection by vaccination under twenty-five years of age is *complete for about seven years only.* Subsequent to twenty-five years of age protection is complete for a longer length of time, proportionate to the age of the individual at the time of the vaccination. *Protection is known to be complete* only when re-vaccination with fresh lymph or scab from a perfect vaccine vesicle fails to take.

"THE QUARANTINE RING."

Under this caption our esteemed contemporary, *Harper's Weekly*, shows surprising evidence of blindness to the most important facts in regard to the wiles of certain rag importers, their aids and abettors, and of the danger of propagating infectious diseases by means of imported rags. Moreover, by implication the *Weekly* accuses the Health Officer of the Port of being in league with speculators engaged in imposing upon the public because of his efforts to protect the public health, while it gives the rag importers credit for being "quite as much interested as any 'ring' of speculators that disease shall not be diffused by the commodities in which they deal, because they have no wish to suffer infection themselves, nor to spread infection," and rejoices that the health authorities of Perth Amboy and New London afford facilities for the introduction of rags from infected places which have been refused pratique by the Health Officer of New York. The *Journal of Commerce* is quoted as "the best authority upon such subjects" as the sources and means of propagating infectious diseases, and the value of consular certificates—except when these certify to the worthlessness of the pretended dis-

infections abroad, and that rags from infected places in Italy and Austria-Hungary are prohibited entry into English ports, but on arrival thereat are given clean bills of health thence for the United States. Of such consular certificates as these the *Weekly* and the *Journal of Commerce* appear never to have heard, and the rag importers have just reason to be proud of backers and speculators after their own heart—without regard to the whole truth. All persons who have taken the pains to make themselves familiar with this contest of the rag importers know that it is not the cost of having rags disinfected by a particular process to which they object, but that they are subjected to any process of disinfection whatever. The "authority" quoted probably knows, if the *Weekly* does not, that rags have always been subject to obligatory quarantine at this port; that until within recent years, since means of disinfecting them have been devised, they were, when brought here in the summer-time, kept in quarantine till frost; or, if permitted to land, required to be stored in isolated warehouses. Moreover, from the very organization of the New York City Health Department imported rags have been considered dangerous, and not allowed to land without special permit. Certain rag importers, who hold large stock, we are informed, desire a return to the old system of retaining cargoes of rags in quarantine, even at the risk of an epidemic such as that of 1856, when the harbor was well-nigh choked with infected cargoes—and among them one, at least, of rags from Alexandria—that the price may be increased; for never before have rags been so cheap, notwithstanding the "exorbitant tax" to which they have been subjected. But sanitarians have learned, if *Harper's Weekly* and the *Journal of Commerce* have not, that infected rags do not lose their dangerous quality by long retention in a ship's hold, especially if the ship, like the rags, is also infected, or by long storage. Ay, more: they have learned that infection under such circumstances may be retained indefinitely. And a health officer at this day of advanced knowledge of epidemic diseases who does not deem it his duty to use the best means in his power to discover and destroy contagium wherever and as soon as practicable after he discovers or has reason to suspect it, is unworthy of the name. Unfortunately, the right still exists

for a vessel to reject quarantine on arrival at any American port, however dangerously infected she or her cargo may be, and resort to another, which may, as in the case of the *Sontag* (cited by the *Weekly*), from an infected port in Japan, find a convenient back door at Perth Amboy or New London, where health officers have a more tender regard for the rag importers than they have for the public, at the risk of an epidemic of small-pox. But we trow the time is not distant when such back-door health officers, like the long detentions in quarantine, will be among the things of the past, and when an embargo on *commerce in disease* will not be considered a nullification of a law of Congress, even though it consists, as in the case cited by the *Weekly*, of "the raw material of paper manufacture."

MORTALITY AND MORBILITY STATISTICS AT MOST RECENT DATES.

ALABAMA.—*Mobile*, population 31,295, reports 75 deaths for the month of October, of which 33 were colored. Nineteen were of children under five years of age. The annual rate per 1000 was 28.68. There were 18 deaths from zymotic diseases and 14 from consumption.

CALIFORNIA.—Reports received from 99 localities throughout the State continue to indicate an absence of disease in an epidemic form. The different zymotic diseases are all of a sporadic nature, and so far as an inference may be drawn from the information received, do not exhibit any tendency to become epidemic. *Cholera infantum* has been reported as quite prevalent in Sacramento, Oakland, San Francisco, Nicolaus, Mariposa, Davisville, Colton, Woodbridge, Healdsburg, Castroville, Lemoore, Knight's Ferry, Dixon, Arbuckle, and Santa Cruz. *Diphtheria* continues to pervade the State in sporadic form, being no doubt carried from place to place by those in contact with the disease. It is still noticed in San Francisco, Oakland, San José, Santa Clara, Sacramento, Amador City, Anderson, Pomona, Jolon, Gonzales, Fall River, Rocklin, Hill's Ferry, Napa, Santa Rosa, Salinas, Livermore, Los Angeles, Oroville, and Redwood City. *Croup* is noticed in Amador City, Sacramento, Truckee, and Rocklin.

Measles continues prevalent in St. Helena, Healdsburg, Calistoga, and Fall River.

Scarlet-fever prevails to a limited extent in Santa Cruz, Napa, Lodi, St. Helena, Anderson, Woodbridge, Santa Rosa, Stockton, and Livermore. *Typhoid-fever* shows a rapid increase and wide range during the month, indicating that the observation made of its increase after the first rains is singularly corroborated. In the reports of this month we find it noticed in Igo, Martinez, Santa Cruz, Willits, Bodie, Dixon, Etna Mills, Petaluma, Anaheim, Healdsburg, Napa, Galt, Fort Bidwell, Truckee, Los Angeles, Sacramento, Oakland, San Francisco, Amador City, Weaverville, Pope Valley, Susanville, Santa Clara, Elk Grove, Alturas, Pomona, Salinas, Santa Rosa, and Gridley. *Small-pox* still prevails in Guaymas and along our southern border. It is now reported as very close to Arizona, and most probably will be carried to California before many months if proper means are not taken to quarantine those ports where it is likely to enter.

CONNECTICUT.—The total number of deaths registered in the 10 cities of Connecticut during October was 403, as against 420 in the month of September.

The annual death rate in the cities was 16.2 per 1000 of the population. There were but 2 deaths from scarlet-fever in all the cities, none from measles, only 24 from diphtheria and croup, only 12 from typhoid-fever in all the cities of Connecticut, representing three sevenths of the whole population of the commonwealth.

New Haven reports 102 deaths in October in a population of 80,000, representing an annual rate of 15.2 per 1000. There were 26 deaths under five years of age. There were 18 deaths from zymotic diseases and 16 from consumption.

DELAWARE.—*Wilmington*, estimated population 55,800, reports 88 deaths during October, representing a ratio of 18.92 per 1000. Thirty-three deaths were of children under five years of age. From zymotic diseases there were 15 deaths, and from consumption 12.

ILLINOIS.—The Eighth Annual Report of the State Board, with Appendix, for the year 1885, is a volume of 686 pages,

summarizing a great deal of practical work for the health of the people, and well calculated to sustain the reputation of the Board in its aggressive warfare against preventable diseases and quackery. Under the authority of the Medical Practice Act the Board has not only well-nigh excluded quacks from the State of Illinois, but it has exercised a salutary influence throughout the country by stimulating legislative action with the same purpose in other States, and done much to elevate the standard of medical education. But the crowning work of the year has been the sanitary survey of the State and the house-to-house inspection service—inspected over 300,000 houses and premises in 395 cities, towns, and villages. These inspections, besides dealing with and abating dangerous conditions to the health of the people, have been of incalculable benefit in their educational bearing; people have been made to see and to realize the benefit of sanitation in its most practical and beneficial aspects. Moreover, to the Board also the inspection service has been of great value in mapping out the relations of the people to the various local conditions of soil and climate, water supply, drainage, cemeteries, slaughter-houses, manufactories, trades, etc., by which, in the event of epidemics, it will be able to deal with them with greatly increased directness and efficiency. The appendix embraces reports on Disinfection and Disinfectants, Proceedings of the Sanitary Council of the Mississippi Valley, Coast Defences against the Cholera, State Sanitary Survey and House-to-House Inspection, Medical Education in the United States and Canada, Meteorological Tables and Vital Statistics.

The marriages, births, and deaths are summarized for five years; but it has been found by the sanitary surveys of places that "vital statistics are not made matters of record except as births, marriages, and deaths respectively are returned to the clerk by clergymen and physicians." "And the abstracts of these returns forwarded to the office of the Board show how meagre and imperfect the records of these important matters when thus made must necessarily be unless the original certificates are faithfully returned to the county clerk as the law directs"—which is rarely done. Based on the returns as far as obtained, the birth rate of the State is estimated at 35 per 1000, the death rate "a little over 14 per 1000—a lower

rate than probably has obtained since Illinois became a State." Marriages reported, 33,566—a little over 19 per 1000. Of the total number of deaths from all causes—23,914—6054, or 25.3 per cent, were caused by zymotic diseases, and chiefly by the following: Miasmatic diseases, 3631; diarrhœal diseases, 3307; diphtheria, 910; *enteric-fever*, 857; cerebro-spinal-fever, 814; scarlet-fever, 484; whooping-cough, 154; *continued-fever*, 131; measles, 108; small-pox, 55; *typhus-fever*, 33; 2262, or 9.4 per cent of total, were caused by consumption; 3697, or a little upward of 15 per cent of the total, were caused by respiratory diseases other than consumption. These are all large proportions and abundantly suggestive of the necessity of continued aggressive work by the State Board of Health.

Chicago, for the month of October, reports population 704,000; mortality, 1043; under five years of age, 473. By zymotic diseases, 330: diphtheria and croup, 151; typhoid-fever, 66; scarlet-fever, 15; other fevers, 12. Death rate, 17.78. So small a death rate with so large a proportion of deaths caused by zymotic diseases suggests a probable over-estimate of population.

Rock Island, with 11,650 inhabitants, reports for the two weeks ending October 30th, 8 deaths. Of children under five years of age there were 2 deaths. Annual death rate per 1000, 17.8. There were no deaths from zymotic diseases; 3 from consumption.

LOUISIANA.—*New Orleans*, with a population of 238,000—173,500 whites and 64,500 colored—reports for the month of October 311 deaths of whites, showing a ratio of 22.51 per 1000, and 179 deaths of colored, showing a ratio of 33.30 per 1000; total deaths, 490, with a ratio per 1000 of 24.70. Of deaths under five years of age there were, of whites and colored, 141. The deaths from zymotic diseases numbered 110—white, 78; colored, 32. The deaths from consumption numbered 73, of which 41 were whites and 32 colored.

MARYLAND.—*Baltimore* reports for five weeks ending October 30th, 733 deaths in a population of 417,220, representing an annual death rate of 18.25 per 1000. There were 273 deaths under five years of age. Deaths from zymotic diseases numbered 118, and from consumption 118.

MICHIGAN.—October report was made in November number. November report is received, promptly, as usual, and before corresponding reports from other State Boards, but kept until next month for uniformity of comparison. *Detroit* reports for the month of October 330 deaths in a population of 175,000, of which 94 were under five years of age. This mortality represents an annual death rate of 22.20 per 1000. There were 113 deaths from zymotic diseases and 18 from consumption.

MINNESOTA.—*Bulletin* for October reports infectious diseases: *Diphtheria*, 12 cases, 6 deaths; *scarlatina*, 36 cases, 4 deaths. *Diseases of animals:* Cases of glanders remaining on hand isolated or not accounted for at first of month, 35; reported during the month, 21; killed, 21; released, 15; isolated, 12; remaining November 1st isolated or not accounted for, 20. *St. Paul* reports 175 deaths during October in a population of 125,000, representing an annual death rate of 16.80 per 1000. There were 91 deaths of children under five years of age. There were 65 deaths from zymotic diseases and 11 from consumption.

NEW JERSEY.—*Hudson County* reports 476 deaths during October in a population of 250,734, making its annual death rate per 1000, 22.8. There were 195 deaths under five years of age. There were 123 deaths from zymotic diseases and 50 from consumption.

Newark reports for the month of October: population, 159,438; deaths, 296—122 under five years of age. From zymotic diseases, 65—chiefly: diphtheria and croup, 31; diarrhœal diseases, 16; scarlet-fever, 8; typhoid-fever, 7; malarial-fever, 4. By an error in computation for September, in our November number, 146 was given instead of 63, as the number of deaths from zymotic diseases.

Elizabethport.—"After drinking a glass of Passaic water yesterday George Berry, a prominent Prohibitionist of Elizabethport, dropped dead.

"The Passaic River has for a long period been a menace to the good health of the towns in New Jersey that depend upon it for their drinking supply, but the death yesterday at Eliza-

bethport of a gentleman immediately after drinking a glass of the water caps the climax.

"What makes the matter worse is the victim was a life-long Prohibitionist. If a Prohibitionist can't stand it, what show has the average devotee of applejack, who scarcely knows what water is when he sees it?"—*New York Herald, December 8th.*

NEW YORK.—The total reported mortality of 123 cities and towns, with populations from 2500 to 1,439,000, by State Board *Bulletin* for October, was 7370, of which 37 per cent were under the age of five years. From zymotic diseases there were 1667 deaths, a ratio of 226.20 per 1000 mortality. From diarrhœal diseases the ratio per 1000 was 66.89; from typhoid-fever, 26.32; from croup and diphtheria, 83.85. Both the latter diseases are reported as mildly prevalent in various localities. From consumption the ratio of mortality was 133.78 per 1000, and 212.29 per 1000 deaths above the age of five years. The combined death-ratio per 1000 from zymotic diseases, consumption, and puerperal diseases was 366.62. From acute respiratory diseases there were 114.66 deaths per 1000 total mortality. For the preceding month 321 delayed returns have been received, of which 33 are from Cohoes, the total mortality for the month to this date being 7560.

New York City, 1,439,000: Deaths for the month, 2977; under five years, 1275; of zymotic diseases per 1000 deaths from all causes, 235.82. By croup and *diphtheria*, 254; *typhoid-fever*, 59; *measles*, 48; *malarial* diseases, 44; whooping-cough, 30; diarrhœal diseases, 234; *consumption*, 432; acute respiratory diseases, 400. Death rate, 23.66.

Brooklyn, 690,000: Deaths, 1321; under five years, 575; of zymotic diseases per 1000 deaths from all causes, 158.21. By croup and *diphtheria*, 125; *typhoid-fever*, 19; *malarial* diseases, 32; *whooping-cough*, 23; scarlet-fever, 13; *measles*, 3; *small-pox*, 2; diarrhœal diseases, 89; *consumption*, 163; acute respiratory diseases, 179. Death rate, 22.59.

Buffalo, 202,818: Deaths (for five weeks ending September 25th), 391; under five years, 183; of zymotic diseases per 1000 deaths from all causes, 263.42. By croup and *diphtheria*,

39; *typhoid-fever*, 19; *malarial* diseases, 5; *diarrhœal* diseases, 35; *consumption*, 35; *acute respiratory diseases*, 22. Death rate, 20.10.

Rochester, 101,000: Deaths, 170; under five years, 58; of zymotic diseases per 1000 deaths from all causes, 284.70. By croup and *diphtheria*, 20; diarrhœal diseases, 10; *typhoid-fever*, 5; *consumption*, 16; *acute respiratory diseases*, 20. Death rate, 20.0. The *lowest* death rate of any city in the State of 10,000 population or upward was that of Oswego (24,000), 10.0. The highest death rate of any of 10,000 population or upward was that of Jamaica (10,089), 33.26. The lowest death rate of any city or town, regardless of population, was that of Owego (6000), 2.0. The highest was that of Oneonta (5000), 50.40—21 deaths, 33.3 under five years of age; 11 were caused by diphtheria, 3 by typhoid-fever, 1 each by disease of the urinary system, circulatory system, and nervous system, 2 by "old age," and 2 unclassified.

The vacancies created in the New York State Board by the resignation of Professor E. M. Moore and the death of Hon. Erastus Brooks have been filled by the appointment of Hon. THOMAS NEWBOLD, ex-State Senator of Poughkeepsie, and Professor MAURICE PERKINS, M.D., of Union College, Schenectady.

NORTH CAROLINA.—*Bulletin* for October summarizes reports from 43 counties. *Typhoid-fever* appears to be the only prevailing infectious disease; 75 cases reported in 17 counties, and "some" in several other counties. *Diphtheria*, *whooping-cough*, and *measles* are reported in four or five counties, but not prevailing to any great extent.

Hog cholera continues in four or five counties, and in some places severely. Mortality statistics are given of the four chief cities—Wilmington, Charlotte, Ashville, and Fayetteville—but without any estimate of population by which to deduce rates. They all appear to be almost wholly exempt from infectious diseases.

OHIO.—Weekly bulletins from 79 observers report upward of 200 cases of typhoid-fever, and increasing frequency of its occurrence in several localities in different parts of the State,

and an epidemic in Columbiana County, near East Rochester. Malarial-fevers continue prevalent, but in decreasing number. Diphtheria is also prevalent, about 125 cases reported weekly. The Board has issued an urgent circular on the causes of typhoid-fever and the means which should be used for its prevention, for free distribution throughout the State. We are gratified to learn that the fixing of a price for the circular on scarlet-fever, noticed in our previous issue, was an oversight.

Cincinnati reports 474 deaths in a population estimated at 325,000, representing a death rate of 17.5 per 1000 yearly. Of deaths under five years of age there were reported 211. From zymotic diseases there were 139 deaths, and from consumption, 63.

Toledo reports 69 deaths during October in a population estimated at 72,000, representing an annual death rate of 11.5 per 1000. Deaths under five years of age, 33; from zymotic diseases, 17, and from consumption, 8.

PENNSYLVANIA.—*Philadelphia*, with an estimated population of 971,363, reports 1432 deaths for four weeks ending October 30th, of which 511 were under five years of age. This mortality represents an annual rate of 19.1 per 1000. From zymotic diseases there were 324 deaths, and from consumption, 232.

Pittsburg reports for the five weeks ending October 30th, 361 deaths in a population estimated at 200,000, of which 171 were under the age of five years. From zymotic diseases are reported 98 deaths, and from consumption, 31. Annual rate, 18.8.

RHODE ISLAND.—*Providence* reports for October 217 deaths in a population estimated at 120,000, of which 69 were less than five years of age. This mortality represents an annual death rate of 21.7 per 1000. Of the causes of death there were from zymotic diseases 56, and from consumption, 28.

TENNESSEE.—The principal diseases, named in the order of their greater prevalence in the State for October, were *malarial-fever, dysentery, typhoid-fever, pneumonia, and bronchitis.*

Death Rates.	Chattanooga,	white,	14.11 ;	colored,	32.72 : 21.42
" "	Clarksville,	"	4.80 ;	"	24.00 : 12.00
" "	Knoxville,	"	10.26 ;	"	28.49 : 14.34
" "	Memphis,	"	24.17 ;	"	29.84 : 26.18
" "	Nashville,	"	10.53 ;	"	29.97 : 21.29

The meteorological features of the month were remarkable for the small amount of rainfall, 0.97 inch only, and the small percentage of cloudiness; also for the absence of any great amount of electrical disturbances. Altogether, the month was very pleasant. The mean temperature was 57°.1, nearly 3° above the mean of October of last year, and more than 6° below that of the corresponding period in 1884. The highest temperature was 88°, recorded on the 11th, and was 3° above the highest recorded in October of last year, and 11° lower than the highest recorded in October of the previous year. The lowest temperature was 22°, recorded on the 28th and 31st, and was respectively 4° above and below the lowest of October, 1884 and 1885. The mean daily range of temperature was greater than in October of any of the three preceding years.

VERMONT.—*Burlington* reports during October 29 deaths in a population of 13,500, of which number 11 were of children under five years of age. There were 5 deaths each from diphtheria and consumption.

VIRGINIA.—*Richmond* reports for October 181 deaths in a population of 100,000, of which 85 were whites and 96 colored. There were 80 deaths of children under five years of age. Annual death rates: whites, 18.21 ; colored, 26.18 ; of whole population, 21.72. There were 53 deaths from zymotic diseases and 18 from consumption.

WISCONSIN.—*Milwaukee* reports for October 230 deaths in a population estimated at 167,000, of which 60 were under five years of age. Annual rate per 1000, 16.53. From zymotic diseases there were 69 deaths, and from consumption, 16.

VITAL STATISTICS OF IMMIGRATION AT THE PORT OF NEW YORK FOR OCTOBER, 1886.—(1) State of Georgia, Glasgow, 230 passengers, 1 death ; (8) Rugia, Hamburgh, 524 pas-

sengers, 1 death, 1 birth; (10) Devonia, Glasgow, 475 passengers, 1 birth; (12) Noordland, Antwerp, 479 passengers, 1 death; (13) Eider, Bremen, 612 passengers, 1 death; (13) Wieland, Hamburgh, 681 passengers, 1 death; (14) Republic, Liverpool, 460 passengers, 1 death; (15) Elysia, Genoa, 413 passengers, 2 deaths; (16) Australia, Hamburgh, 370 passengers, 3 deaths, 2 births; (16) La Champagne, Havre, 238 passengers, 1 death; (19) Eutella, Palermo, 566 passengers, 1 death; (20) Slavonia, Hamburgh, 381 passengers, 1 death, 1 birth; (20) City of Chicago, Liverpool, 634 passengers, 1 death; (21) Saale, Bremen, 1033 passengers, 1 death, 1 birth; (23) Marsala, Hamburgh, 270 passengers, 1 death; (26) Aller, Bremen, 857 passengers, 2 deaths; (30) Bohemia, Hamburgh, 696 passengers, 1 death; (30) Taormina, Hamburgh, 280 passengers, 1 birth.

Total passengers, 9000; deaths, 10; births, 7.

MORTALITY STATISTICS ABROAD in cities containing 100,000 inhabitants and upward at the most recent dates. During the *week* ending *November 13th*, of 14 large English cities, the average annual death rate was 21.1. The lowest was in Sheffield, 17.3, the highest in Newcastle, 24.6. In London the rate was 17.9; Paris, 22.3; Havre, 32.0; Brussels, 21.7; Anvers, 26.7; Gand, 22.5; Liège, 22.3; Breslau, 29.7; Trieste, 25.8; Christiania, 19.5. During the *week* ending *November 6th:* Amsterdam, 20.6; Rotterdam, 20.9; Hague, 30.0; Lyons, 20.7; Berlin, 22.7; Hamburg, 31.6; Munich, 25.6; Dresden, 20.7; Leipzig, 17.1; Frankfort, 14.8; Koenigsberg, 23.7; Magdeburg, 19.6; Hanover, 35.4; Stuttgart, 13.2; Bremen, 19.3; Düsseldorf, 19.0; Nuremberg, 19.0; Dantzig, 25.8; Strasburg, 20.9; Chemnitz, 16.4; Elberfeld, 17.6; Altona, 27.8; Barmen, 19.7; Vienna, 22.5; Pesth, 39.5; Prague, 26.9; Cracow, 32.5; Copenhagen, 21.4; Stockholm, 17.0; St. Petersburg, 22.1; Warsaw, 23.9; Odessa, 45.2; Venice, 23.6; Bucharest, 24.4. During *week* ending *October 31st:* Saint Étienne, 19.2; Nice, 22.7. During the *month of October:* Marseilles, 26.3; Bordeaux, 22.5; Nantes, 22.3; Barcelona, 29.2. *October 22d–28th:* Cairo, 45.5; Alexandria, 38.6; Port Said (10,693 inhabitants), 63.2; Suez (9985), 41.7. *October 6th–12th:* Bombay, 21.8. *Sep-*

tember 18th–24th: Madras, 35.8. *Month of August:* Buenos Ayres, 22.1.

Cholera.—During the *three weeks* ending *November 6th: Deaths* reported in Pesth, 230; Vienna, 1; Ezegeden, 73. During the *month of September:* Bologne, 67. (Telegraphic:) Buenos Ayres, *December 3d, vid* Galveston.—Seventeen new cases of cholera were reported in this city yesterday, and 9 deaths from the disease occurred here. In Rosario 34 new cases were reported, and there were 25 deaths. In Cordova there were 12 new cases and 5 deaths; *December 7th,* in Rosario, 22 deaths. In Cordova, during the same period, 17 new cases and 10 deaths. Santiago de Chili, *December 11th, vid* Galveston: A telegram from Uspallata announces the fact that cholera has made its appearance in Mendoza. *December 10th,* 7 cases were reported to have occurred among the prisoners in the penitentiary and prison. Great alarm is felt by the people. In consequence of the appearance of cholera in Montevideo the President of Chili has ordered that all ports be closed against vessels which sailed from that place since *December 7th.* There were reported in Montevideo, *December 11th,* 15 new cases of cholera and 6 deaths from the disease; in Cordova, 15 new cases, and in Rosario, 25.

Rags and Wearing Apparel continue to be regarded by all competent health authorities as dangerous means of propagating cholera everywhere except by a few in the United States, who wear Holyoke spectacles or who are very near-sighted from other causes.

The Local Government Board, of London, has allowed its order prohibiting the importation of rags from Spain to expire, November 1st; but it has extended its order until May 1st, next, against the importation of rags from Italy; and in view of the prevalence of cholera in Pesth, Trieste, and other places, has also prohibited the importation of rags from Austria-Hungary for the same period.

The Netherlands Government has issued a ministerial notification prohibiting, from August 27th, 1886, the importation and the transit of rags, worn clothing, and unwashed underclothing and bedding, coming from Italy and Austria-Hungary. Worn clothing brought by travellers as part of their baggage does not come within the prohibition.

The Swiss Federal Council have also prohibited, by an order of August 20th, and until the issue of a further order, the importation and transit of rags, old clothes, unwashed linen, etc., coming from Italy, except such as may be included in travellers' baggage.

Cholera from Infected Cotton.—From *Roma*, a newspaper published in Naples, of October 28th ultimo, we extract the following account of the introduction of cholera into Maddaloni, where from October 21st to 25th 7 cases, with 4 deaths, had occurred. From investigations made by the Prefect of Caserta, who, in company with sanitary inspectors, visited the place, it appears that the disease was traced to some bales of cotton that had been brought from Barra. It originated in the house in which the cotton was stored, where two persons of the same family were simultaneously attacked. The part of the city in which the disease made its appearance was in the worst possible unsanitary condition—stagnant and putrid water in the streets and filthy, unventilated houses. The hope is expressed that the energy shown by the prefect and by the local authorities in adopting measures necessary to arrest the progress of the disease would be sufficient to destroy it in its outset; and this hope is supported by the fact that no new case had occurred during the two days following to the date of this published account. But, it is remarked, from this occurrence in Maddaloni it is impossible to say that the disease cannot be imported from an infected district by similar means.

Small-pox.—During the *three weeks* ending *November 6th:* Deaths reported in Pesth, 221; Paris, 5; St. Petersburg, 10; Warsaw, 15; Odessa, 2; Port Said, 20. During the *month of October:* In Marseilles, 41; Bordeaux, 1; Nice, 2; Hamburg, 4. During the *month of July:* Buenos Ayres, 56; *August*, 41.

Measles was less prevalent than by returns a month ago. During the *week* ending *November 13th:* Deaths reported in 14 large English cities, 65: London, 29; Leeds, 13; Liverpool, 10; in the rest, 13—none in Dublin, Edinburgh, Belfast, Bradford, and Hull. In Paris, 18.

Scarlet fever.—During the *week* ending *November 13th:* Deaths reported in London, 29; Liverpool, 13; Glasgow, 16;

Dublin, 15; Manchester, 7; Sheffield, 7; Leeds, 6; Bristol, 7; 1 to 4 in the other large cities except Bradford and Hull, in which there was none. In Paris, 6. During *week* ending *November 6th:* Hanover, 39; St. Petersburg, 11; Warsaw, 14; Odessa, 27; Pesth, 13.

Diphtheria and Croup.—During the *week* ending *November 13th:* Deaths reported in London, 34; Glasgow, 9; other of the 14 large English cities except Leeds, Sheffield, Bradford, Hull, Newcastle, and Belfast (where there was none), 17. In Paris, 19; Breslau, 12; Christiania, 10. During *week* ending *November 6th:* Berlin, 67; Hamburg, 28; Dresden, 10; Leipzig, 8; Magdeburg, 6; Nuremberg, 7; Vienna, 15; Pesth, 18; Prague, 14.

Typhoid-fever.—During the *week* ending *November 13th:* Deaths reported in London, 20; in 11 other (of the 14) large English cities, 30; Bradford and Hull, none. In Paris, 21. During *week* ending *November 6th:* St. Petersburg, 15. During the *month of October:* Marseilles, 38; Bordeaux, 13; Nantes, 19.

The reader will not fail to observe from the foregoing how much less prevalent epidemic diseases, excepting cholera and small-pox, are abroad than they are in American cities.

PASTEUR'S LATEST REPORT of inoculation for rabies, made to the Académie de Medicine, November 2d, announces that he had inoculated 2490 persons, of whom 1750 were of France and Algeria; of these 1750 cases, 10, or 1 in 170, failed—died of rabies. The average number of deaths from rabies annually in Paris for many years has been 12; last year it was only 3, of which 1 had been inoculated, but not by the "intensive" method. Pasteur now finds it necessary in bad cases—those in which the face has been seriously bitten—to use more powerful virus and to more rapidly repeat the inoculations. He attributes the failures of Dr. Fitsch, in Vienna, to his not adopting this more intense and rapid method.

M. Pasteur's reports, however, have been severely criticised both in the medical and the popular press. His explanation of fatal results being due to the use of virus insufficiently "intense," is said by his critics to be inconsistent with his previous faith and directions.

OBITUARY.

DR. JOSEPH GIBBONS RICHARDSON, Professor of Hygiene in the Medical Department of the University of Pennsylvania, and member of the Board of Health of Philadelphia, died of apoplexy at his residence in that city, November 13th, in the fifty-first year of his age. A native of Philadelphia, and a member of the Society of Friends, he pursued his studies at the University of Pennsylvania, from which he received his medical degree in 1862. Subsequently he was resident physician in the Pennsylvania Hospital and the Wills Hospital, and resided for five years at Union Springs, Cayuga County, New York, returning to Philadelphia as his place of permanent abode in 1868. He was the author of a work on medical microscopy, one of the collaborators of THE SANITARIAN, and a frequent contributor to it and to other medical journals. He was secretary of the Biological and Microscopical Section of the Academy of the Natural Sciences, a Fellow of the College of Physicians, a member of the Philadelphia County Medical Society and of the American Medical Association, and a corresponding member of the Société Française d'Hygiène. For several years he was microscopist to the Pennsylvania Hospital and visiting physician to the Presbyterian Hospital of this city.

DR. JOHN P. GRAY, Superintendent of the New York State Lunatic Asylum, at Utica, died in uræmic coma, Monday, November 29th, at the asylum in that city.

Since Dr. Gray was shot through the upper jaw, March 16th, 1882, by an insane patient, Henry Remshaw, he has never fully recovered. The wound seriously affected his nasal breathing, left a neuralgia which was almost constant, and gave a terrible shock to the nervous system. Dr. Gray bore up under it manfully, but it weakened him seriously, and rendered the burdens of his position more trying and exhaustive. His intimate friends have been much alarmed about his condition, and the management of the asylum thoughtfully gave him leave of absence last winter, and he spent some time in Thomasville, Ga., and afterward at Carlsbad and elsewhere

in Europe. The attempt to return again to his work, and the cares incident to it, proved too much for him, and week by week the disease took closer hold upon him, while his strength failed, and sure signs came that the end was near. About three weeks ago the doctor caught a severe cold, from which dated his rapid decline.

Dr. Gray was born in Halfmoon, Centre County, Penn., August 6th, 1825, and was educated in the common school, at Bellefonte Academy, and at Dickinson College, and in medicine at the University of Pennsylvania. Receiving the degree of A.M. from Dickinson College in 1846, and of M.D. from the University of Pennsylvania in 1848, he was in the latter year appointed one of the resident physicians of the Pennsylvania Hospital. He was invited to the New York State Lunatic Asylum, in Utica, in 1851, to become third assistant physician. So marked were his qualities and so valuable his services that his promotion was very rapid; for he was appointed second assistant physician in 1852, and first assistant and acting superintendent in 1853, when only twenty-eight years of age. In that year, also, he was appointed medical superintendent of the Michigan State Lunatic Asylum, and designed the plans for the asylum at Kalamazoo. The managers of the institution in Utica had learned his merits and his efficiency, and in 1854 he gave up his position in Michigan and chose the scene of his life-work, beginning his notable career as medical superintendent of the Utica Asylum. His labors as editor-in-chief of the *American Journal of Insanity* began in the same year.

Personally Dr. Gray was a lovable Christian gentleman, and one who endeared himself to every one with whom he came in contact.

CEMENTATION *versus* CREMATION is said to have been among the new topics discussed by a party of visitors who recently inspected the Buffalo Crematory. The *Sunday News* reports the substance of a conversation on the subject, in part as follows: "I have an idea," said one, "which combines all the advantages claimed for cremation and which would also meet with universal favor among those who can never be induced to change their notions respecting interment of the

dead. I would bury the dead in a case or mould of cement, or some similar material, using coffins or not, as economy or personal preference might suggest. Coffins or caskets of wood or metal could be dispensed with. The undertaker who is called to prepare the body for burial would ascertain the size of the deceased and come, let us say, with a handsome metal case, which will serve as a mould. The lower half would be filled with cement, and the body, dressed merely in a shroud, would be placed in the cement and laid out, if desired, to be viewed as at ordinary funerals. A lid with a glass window directly over the head would enable the mourners to see the features of the dead. On the morning of the funeral the remaining portion of the casket would be filled with cement and allowed to harden with the lower half. The hearse would convey the casket to the cemetery and there opened; the solid block of cement, of presentable contour, and as hard as rock, in which the remains are incased, would be taken out and deposited in a vault or in the earth. The moisture in the ground and time would harden this block still more. The name of the deceased, age and dates of birth and death may readily be carved in the cement before it is completely hardened, so that at any time the remains could easily be identified without further records. As to the advantages of cementation on sanitary grounds, I submit that they are superior to those of cremation. After death the cement casket is not removed. Cement is impermeable and impenetrable. The body, instead of decomposing, would dry up and wither in the cement encasement. No liquids would find their way out into the ground, and the horrible dreams of the imagination about putrid and decaying corpses of dear ones would forever be put at rest. Body-snatchers could do nothing with corpses packed in cement."

"Why didn't you present a paper upon this interesting subject before the convention?" asked a fellow-scientist when the speaker had finished.

"I am not quite done with experimenting upon the plan as yet," he replied; "but next year I will have a paper ready upon the subject of cementation. I have already made application for a patent upon the moulds and process of cementation as far as I have progressed with them."

LITERARY NOTICES.

LECTURES ON THE PRINCIPLES AND PRACTICE OF MEDICINE. Delivered in Chicago Medical College, Medical Department of the Northwestern University. By NATHAN SMITH DAVIS, A.M., M.D., LL.D., Dean of the Faculty and Professor of Principles and Practice of Medicine and Clinical Medicine in Chicago Medical College; Senior Physician to the Mercy Hospital, Chicago; Member and ex-President of the American Medical Association, of the Illinois State Medical Society, and of the Chicago Medical Society; Member of the Illinois State Microscopical Society, Chicago Academy of Sciences, and American Public Health Association; Honorary Member of the New York Academy of Medicine, and of the College of Physicians, Philadelphia, etc. 8vo, pp. 896. Chicago: Jansen, McClurg & Co. This is a work of unusual directness and practical utility to medical students and young practitioners, being a stenographic report of the course of instruction, in great part clinical, on the principles and practice of medicine, given extempore by the author, according to his custom, in the Medical Department of the Chicago Medical College, but carefully revised and elaborated from the reporter's copy. Thirty-five years' lecturing to medical students, and all the while keeping himself abreast with the advances in the science and art of medicine, has enabled the author to so thoroughly eliminate the useless and comprehend the useful as to present a work alike admirable for its conciseness and comprehensiveness. It consists of ninety-two lectures, classified under Elementary Considerations, Individual Diseases, General Diseases, and Local Diseases, all more or less clinical. It embodies the metric system of weights and measures, with the equivalents of the apothecaries' system in brackets, whereby the reader may with facility acquire a practical knowledge without risk of mistake. We heartily commend the work as one of the best of its kind hitherto published.

THE SEPARATE SYSTEM OF SEWERAGE: ITS THEORY AND CONSTRUCTION. By CADY STALEY, President of the Case School of Applied Science, Cleveland, O., and GEORGE S. PIERSON, C.E. New York: D. Van Nostrand.

Presuming that this, the latest practical work which has come to our knowledge on sewerage, would shed some light upon the vexed question of methods to be pursued in sewering our inland towns, we took it up with every wish to find something conclusive upon the subject, which we could recommend as a guide to our readers; but we regret to say that, with the exception of the mathematical formulas introduced, which may be all correct, but which are certainly needlessly complicated and lacking in simplicity—and the illustrations, which, while well engraved, are imperfectly explained and very obscure—we find nothing which has not already been better said, nor any arguments in support of the system recommended which have not been fully met and refuted, so far as they apply to the system as applicable to all situations, which we understand to be at least one of the aims of this book to verify.

We admit that there are situations to which the separate method is peculiarly applicable, but as a whole we need further light before we can recommend its universal adoption. The claim here made for it, of being cheaper, both in first cost and maintenance, to the extent of from one third to one eighth of that of the combined method, is not borne out by our experience. It must be remembered in this connection that the combined method aims to drain *and* sewer the locality, the subsoil water not being carried off in the sewers, as the writer would lead one to believe was a necessity of this method.

The separate method being confined to the removal of house waste solely—the subsoil water if cared for being led off by methods not peculiar to the separate system alone—while the surface water, by the latter system, it is claimed, may be left to find its way in open gutters. If this course be admissible, the separate will be the cheaper method, but not to the extent here claimed for it. The report for 1881 of the cost of the entire system of combined sewers in Chicago, where from the flatness of the site there is an excess of large brick sewers, shows that the 366 miles of sewers in

that city, ranging from 12 inches to 12 feet in diameter, averaged $3.02 per foot. And the cost of keeping them clean was 1.8 cents per year per lineal foot. The cost of the Memphis separate system, with manholes (since found to be necessary), will be, at the least, $1.60 per foot, or over half as much, while it must be borne in mind that Chicago is both sewered and drained, while Memphis is not. The cheapest method is not what the sanitarian is looking for, but rather what method is best calculated to promote the public health.

We call attention to the statistics of the city of Buntzlau, carefully prepared by Dr. Adelt, and published in the *Sanitary Engineer* November 20th, 1886, wherein he shows the effect of sewerage on the mortality from typhoid-fever in that city for twenty years past, as follows:

"The old part of the city has a combined system of sewer for that part which is most densely populated, and here the mortality from typhus and typhoid (1863–83) was 4.8 per 1000. A part of the old city and a large part of the new have sewers for rain-water, street washings, and house drainage *exclusive* of excreta—the latter disposed of in privy vaults—and in this section the average annual mortality from typhus and typhoid was 29.2 per 1000. In that part of the city without sewers the corresponding rate was 35.2, while in the vicinity of the sewage irrigation fields it has been 36.3."

For the localities where the respective systems are applicable, we would refer to the National Board of Health Report Supplement, December 24th, 1880; and for a fair, dispassionate, and unbiassed statement of the so-called merits of the separate system, in comparison with the combined, in populous districts, or wherever the latter is applicable, we would refer to an exhaustive article by Elliot Clark, published in the second annual report of State Board of Health, Lunacy, and Charity of Massachusetts for 1880.

THE PUBLIC HERALD, under the direction of Lum Smith, continues its good work in exposing advertising swindlers and quacks, and deserves the support of all honorable journalists.

THE COLUMBIA BICYCLE CALENDAR FOR 1887, issued by the Pope Manufacturing Company, Boston, is an elegant work

in chromo-lithography and the letter-press. Each day of the year is given upon a separate slip, with a 'cycling quotation, newsy, of information, or otherwise interesting. The calendar proper is mounted upon a back of heavy board, and as a work of convenient art it is worthy of a place in office, library, or parlor.

INTUSSUSCEPTION IN CHILDREN, by W. E. FOREST, M.D., a pamphlet reprint of twenty-seven pages from the *American Journal of Obstetrics and Diseases of Women and Children*, cites three cases of successful treatment by means of persistent warm water injections, followed by a description of the varieties and characteristic symptoms of intussusception in children in detail, and the best means of cure.

ENTERO-COLITIS ("Summer Diarrhœa of Children"), by W. C. COOK, M.D., Health Officer of Davidson County, Tenn., a pamphlet of 14 pages, read before the Nashville Academy of Medicine recently, is a paper of much practical value to physicians with regard to the causes of one of the most common diseases they are called upon to treat, and worthy of extended circulation.

IS ELECTROLYSIS A FAILURE IN THE TREATMENT OF URETHRAL STRICTURES? by ROBERT NEUMAN, M.D., New York, is the subject of a pamphlet reprint from the *Medical Record*, wherein the author shows unmistakable evidence that with good instruments it is not.

THE PACIFIC RECORD OF MEDICINE AND PHARMACY. A Monthly *Résumé* of Medical and Pharmaceutical Progress. Charles M. Moore, M.D., editor. Quarto, 32 pp., double column.

This is a new periodical, of which we have received the August and September numbers, well filled with original and selected matter of interest to all medical practitioners. $2 a year, 20 cents a number.

THE EARTH, Vol. I., No. 1, November 5th, 1886, a substantial large quarto of 16 pages, well filled with entertaining essays and excerpta, announces the absorption of the *Day Star* into its own sphere, and promises a weekly revolution of

events and observations on religious, political, financial, and artistical subjects. Subscription, $2 a year in advance, 5 cents a number. The Earth Publishing Co., 40 Broad Street, New York.

THE PREVENTION OF FIRE, chiefly with reference to Hospitals, Asylums, and other Public Institutions, by WILLIAM PAUL GERHARD, C.E., is a very instructive and useful pamphlet of 30 pages, which may be obtained from the author, 6 Astor Place, New York, at 60 cents per copy.

HYDROLEINE.—Heretofore, to the best of our knowledge, says the *Medical Bulletin*, there has never been manufactured an emulsion of cod-liver oil that was not subject to more or less separation of the oil from the vehicle under certain conditions of temperature. To patients who were not familiar with the properties of all cod-liver oil preparations this separation of the oil has been an objection, and, in fact, has created in many cases a suspicion that the preparation itself had undergone changes depriving it of its therapeutic value. Messrs. William F. Kidder & Co., of New York, after several years of investigation and experimentation with hydroleine (hydrated oil), have finally succeeded in making hydroleine so that it will keep indefinitely and withstand any degree of heat or cold without the slightest separation of the oil. Although the process of manufacture has been changed to improve the keeping qualities of the drug, the preparation remains the same as before, with the exception that it is now somewhat thicker than formerly. This improvement in the pharmacy of the preparation has not been made at the expense of its medicinal qualities. Hydroleine is just as effective as ever.

SUBSCRIPTIONS ARE NOW DUE FOR 1887.

Some there are for variable lengths of time *overdue*, presumably because those who owe them have thought $4 too small to write a check or to take the trouble to obtain a postal order for. But the number of such trifling inconveniences to subscribers is so great as to be of very considerable inconvenience to us. Attention is particularly invited to the head-lines of table of contents, page 1, ad. sheet.

INDEX.

Air, The, of the Sea, 155.
Aji-aji, 544.
Alcohol, Use of, Van Bibber, 343.
Alsdorf, J., M.D., Syphilis, 145.
American Climatological Association, 124.
American Medical Association, 56.
American Medical Editors' Association, 156.
American Public Health Association, 270, 334.
Annual Address of President, 340, Officers and Committees, 353.
Analyst, The, and his Deeds, 534.
Army, U. S., Health of, 22, 215, 317, 416, 499.
Asylum Abuses, Letchworth, 404.

Baird, G., M.D., Destruction of Night-soil and Garbage by Fire, 334; Sanitation in Street Paving, 324.
Baker, H. B., M.D., The Introduction of Dangerous Diseases, 61.
Bayles, J. C., Should Dwelling Houses be Plumbed? 529.
Bell, A. N., A.M., M.D., Tea, 312; The Seaside Home, 68.
Boards of Health Reports, State and Local:
Alabama, 455; California, 456; France, 370; Maryland, 459; Massachusetts, 459; Michigan, 462; New Hampshire, 464; Ontario, 373; Pennsylvania, 468; Rhode Island, 470; Baltimore, Md., 86; Boston, Mass., 370; Brooklyn, N. Y., 86, 181; Chicago, Ill., 371; Cincinnati, O., 182; District of Columbia, 184; Mansfield, O., 184; New Haven, Ct., 185; Paterson, N. J., 186; Reading, Pa., 186; Richmond, Va., 187; Rock Island, Ill., 86; Savannah, Ga., 87; Worcester, Mass., 374; Yonkers, N. Y., 374.
Bread, Bitter, Ed., 162.
Brouardel, M., Poisoning by Sulphuretted Hydrogen, 212.
Bryce, P. H., M.D., Decomposition of Albuminoid Substances, 351.
Celerina in Nervous Diseases, 135.
Cementation *vs.* Cremation, 566.
Children, The Health of, 66.
Children, The Mortality of, Firks, 64.
Cholera 94, 179, 283, 368, 474, 562.
Cholera, Hog, Progress in the Investigation of, Salmon, 327.
Climate, Forests and, Woeikof, 264.
Climate, The, of Colorado, 133.
Climatic Treatment of Phthisis, Williams, 41.
Clothing, Woollen, Ed., 267.
Comma Bacillus, The, Destructiveness of Heat on, 357.
Corbally, T. P., A.M., M.D., Nomenclature of Sanitary Science, 97.
Cotton, Infected, 563.
Curtiss, R. J., M.D., Hygiene of Nature, 3.

Decomposition of Albuminoid Substance, Bryce, 351.
Differentiation, Physics and Physiological Action of, 127.
Diphtheria, 284, 369, 475.
Diphtheria, Epidemic of, 111.
Diphtheria, Scarlet-Fever, and Measles, 94, 180.
Disease, Natural Selection and Immunity from, Curtiss, 3.
Diseases, Dangerous, The Introduction of, Baker, 61.
Diseases, Infectious, Abroad, 93, 179, 283, 368.
Diseases, Infectious, An Act to Prevent the Spread of (N. Y.), 65.
Diseases, Infectious, Interstate Notification of, Hewitt, 343, 438.
Diseases of Poverty, 136.
Disinfectants, Report of Committee on, A. P. H. A., 351.
Disinfectant, Sufficiency of Steam Heat as a, Holt, 331.
Disinfection, 139.
Disinfection of Rags, Report of Committee, A. P. H. A., 347.
Dogiel, A., The Albuminoids in Milk, 436.

Education in the United States, Progress of, 223.
Education Abroad, 537.
Fenner, E., Dangerous Soil Moisture in New Orleans, 20.
Fevers, 95, 370.
Firks, V., The Mortality of Children, 64.
Forests and Climate, Woeikof, 264.
Forests, The Salubrity of, 266.

Garbage and Night-soil, Destruction of by Fire, Baird, 334.

Garbage, Utilization of, McElhenie, 527.
Gihon, A. L., M.D., U.S.N., Preventive Medicine, 40.
Glanders, 166.
Glasgow, Sanitary Condition of, Russell, 352.
Ground-water, The Influence of on Health, Latham, 394.

Health of the People, 114.
Health Service, National, 91.
Health Resorts, Various, 132.
Health, State Boards of, Communications from, A. P. H. A., 350.
Health, The Influence of Ground-water on, Latham, 394.
Health of Children, 66.
Healthy Homes, 140.
Heart Disease, Effects of High Altitude on, 124.
Hewitt, C. N., M.D., Interstate Notification of Infectious Diseases, 343, 438.
Hochheimer, L., What are Cruel Punishments? 214.
Holt, J., M.D., Sufficiency of Steam Heat as a Disinfectant, 331.
Houses, American Tenement, Wingate, 289.
Hydrogen, Sulphuretted Poisoning by, Brouardel and Loye, 212.
Hydroleine, 384, 572.
Hygiene of Nature, Curtiss, 3.

Immigration, Vital Statistics of, 85, 180, 284, 467, 561.
Infectious Diseases Abroad, 93, 179, 283, 368.
Infectious Diseases, An Act to Prevent the Spread of (N. Y.), 63.
Infectious Diseases, Interstate Notification of, Hewitt, 343, 438.
Inoculations, Dr. Ferran's, 142.
Inoculation, Yellow-Fever, 95.
International Medical Congress, 250.

Jackson, L. D., Statistics of Sewage Farms, 259.

Laborer, Who is the? 248.
Lactopeptine, 249, 384.
Lager Beer an Intoxicant, Is? 382.
Latham, B., M. I. C. E., The Influence of Ground-water on Health, 394.
Lead Poisoning from Drinking Water, Thomas, 262.
Letchworth, Hon. W. P., Asylum Abuses, 404.
Life, Increase of the Duration and Economical Value of, Wells, 403.
Literary Notices:
Annual Report of the Bureau of Labor Statistics, N. Y., 189; Catarrh of the Upper Air Tract (Sexton), 288; Cocoaine in Hay Fever (Bishop), 382; Columbia Bicycle Calender, 570; Davis Principles of Practice, 568; Diseases of Digestion (Eichhorst), 188; Diseases of the Nerves, Muscles and Skin (Eichhorst), 478; Diseases of the Stomach and Intestines (Dujardin-Beaumetz), 379; Earth, The, 171; Education in Japan, 192; Electrolysis (Amory), 378; Electrolysis (Newman), 571; Entero-Colitis (Cook), 571; Forest, Intussusception, 571; Fracture of the Coracoid Process (Byers), 382; Genuine Works of Hippocrates (Adams), 188; Hatters' Consumption (Stickler), 191; How to Strengthen the Memory (Holbrook), 379; Hygienic Treatment of Consumption (Richardson), 378; Index Catalogue of the Library of the Surgeon-General's Office, U.S.A., 378; Insidious Septicæmia (Engelmann), 381; Lum Smith's Herald, 570; Manual of Dietetics (Fothergill), 95; Medical Expert Testimony (Wey), 287; Medical and Surgical Directory of the U. S., 477; Memorial Wreath for the Prosecution in the Graves Malpractice Suit (Lane), 480; *Neurological Review*, 96; *N. Y. Medical Monthly*, 192; *Pacific Medical Record*, 571; Physical Training in American Colleges (Hartwell), 188; Prevention of Fire (Gerhard), 572; Progress, 383; Relation of the State and the Medical Profession (Lundy), 286; Rheumatism (Maclagan), 378; Sanitary Conditions and Necessities of School-houses and School-life (Hibberd), 287; Sanitary Value of the Chemical Analysis of Potable Waters (Tucker), 288; Sanitation of London and the Suburbs (Chadwick), 286; Sanitation *vs.* Militarianism (Chadwick), 286; *St. Louis Medical and Surgical Journal*, 383; Staley and Pierson's Separate System of Sewerage, 569; Surgical Injuries (Reed), 286; The Century Dictionary, 191; *The Medical Register*, 96; The Physicians' Visiting List, 478; The Rice Fields of Carolina (Starnes), 480; The Students' Aquarium (Jacobs), 382; Third Report of the Committee on Lunacy of the Board of Public Charities of Pennsylvania, 380; Trans. Ala. State Medical Association, 479; Trans. Louisi-

ana State Medical Association, 479; Typhoid-Fever (Kennedy), 287; Urinalysis and Toxicology (Witthaus), 379; Wanklin Method of Sanitary Water Analysis (Smart), 287; Winconsin State Medical Society Trans., 381.
Lives Lost on Board Passenger Vessels, 473.
Lomb Prizes, 476.
Loye, M., Poisoning by Sulphuretted Hydrogen, 212.

McElhenie, T. D., Utilization of Garbage, 527.
Measles, 284, 369, 475.
Medical Congress, The International, 250.
Medical Skill, Extraordinary, 316.
Medicine, Preventive, Gihon, 40.
Medicine, State, Rauch, 193.
Memphis, Tenn., Water Supply of, 375; Six Years' Sanitary Work in, Thornton, 347, 424.
Micro-organisms and the Germ Theory of Disease, 138.
Milk, Newton, 311.
Milk, Bad, Porter, 435.
Milk, The Albuminoids in, Dogiel, 436.
Mineral Waters, Therapeutical Value of, 129.
Mortality of Children, Firks, 64.
Mortality and Morbility Statistics: Alabama, 85, 162, 270, 357, 552; California, 75, 163, 271, 358, 457, 552; Connecticut, 75, 84, 164, 271, 359, 553; Delaware, 164, 273, 360, 457, 553; Dist. of Columbia, 165, 273; Georgia, 165; Illinois, 85, 165, 273, 360, 458, 554; Louisiana, 85, 166, 273, 360, 458, 555; Maryland, 171, 275, 361, 458, 555; Massachusetts, 275; Michigan, 76, 167, 276, 361, 463, 556; Minnesota, 77, 85, 170, 277, 363, 463, 556; Missouri, 85, 171, 277, 364, 464; New Hampshire, 78; New Jersey, 84, 171, 278, 364, 465, 556; New York, 78, 172, 278, 364, 466, 557; North Carolina, 80, 175, 219, 467, 558; Ohio, 77, 171, 280, 365, 468, 559; Pennsylvania, 84, 176, 280, 365, 470, 559; Rhode Island, 84, 177, 281, 366, 559; Tennessee, 83, 177, 281, 366, 472, 560; Vermont, 178, 560; Virginia, 85, 178, 282, 367, 473, 560; Wisconsin, 179, 282, 367, 473, 560; Foreign, 91, 179, 282, 368, 474, 561.
Museum of Hygiene, Turner, 481.

National Board of Health, Ed., 157.
National Health Service, 91.
Nervous Diseases, Relation of High Altitudes to, 130.
New Surgeon-General, U. S. A., Ed., 447.
New Orleans, Dangerous Soil-moisture in, Fenner, 20.
Newport, R. I., Sanitary Protection Association, 375.
Newton, W. K., M.D., Milk, 311.
New York, An Act to Prevent the Spread of Infectious Diseases, 65.
New York Prison Association, 376.
Nicholson, A. W., M.D., Ozone, 440.
Nickel Poison, 415.
Night-soil and Garbage, Destruction of by Fire, Baird, 334.
Nomenclature of Sanitary Science, Corbally, 97.
Nutmegs Poisonous, 393.

Obituary:
Gray, John P., 565.
Hamilton, F. H., M.D., LL.D., 284.
Nichols, R., 377.
Richardson, Joseph Gibbons, 565.
Ozone, Nicholson, 440.

Pasteur's Latest Report on Rabies Prevention, 564.
Paving, Street Sanitation in, Baird, 324.
Pepsin, 445.
Personal:
Pancoast, W. H., M.D., 117.
Wood, T. F., M.D., 350.
Philadelphia, The Water Supply, 118.
Phthisis, Prevention of, in Mill-hands, 130.
Phthisis, The Climatic Treatment of, Williams, 41.
Playter, E., M.D., Disposal of Sewage, 336.
Poisoning by Sulphuretted Hydrogen, Brouardel and Loye, 212.
Pneumonia, Causation of, 131.
Preventive Medicine, Gihon, 40.
Prince, D., M.D., Removal from the Air of the Dust or Particulate Material Supposed to Produce Yellow-Fever, 345.
Prison Association of New York, 376.
Pulmonary Disease, Pneumatic Treatment of, 125.
Punishments, Cruel, What are? Hochheimer, 214.

"Quarantine Ring, The," Ed., 550.

Rabies Prevention, Pasteur's Latest Report, 564.
Rag Importers Obstructing Commerce, Ed., 158.
Rags, Disinfection of, Report of Committee, A. P. H. A., 347.
Rags, Imported, Danger of, 112.

Rags, The Importation of into Boston, 476.
Rauch, J. H., M.D., State Medicine, 193.
Rocky Mountain Fever, 128.
Rush Monument Committee, 451.
Russell, W., M.D., Sanitary Condition of Glasgow, 352.

Saccharine, 315.
Salmon, D. E., D.V.M., Progress in the Investigation of Hog Cholera, 327.
Sanitary Condition of Public Buildings, 141.
Sanitary Convention at Kalamazoo, Mich., 136.
Sanitary Convention, The Penn. State, 111.
Sanitary Protection Association, Newport, R. I., 375.
Sanitary Regulations of the Hebrews, 137.
Sanitary Science, The Nomenclature of, Corbally, 97.
Sanitary Significance of Sporadic Typhoid-Fever, 115.
Sanitary Work in Memphis, Tenn., Thornton, 347, 424.
Sanitation in Street Paving, Baird, 324.
Sanitation, Economic, 113.
Sanitation, Practical, Some Results of, 357.
Sanitation, Public, Proposed New Plan of, Wight, 205.
Scarlet-Fever, 284, 369, 475.
Sea, The Air of the, 155.
Seaside Home, The, Bell, 68.
Sewage, Disposal of, Playter, 336.
Sewage Farms, Statistics of, Jackson, 259.
Sewage, The Treatment of, Tidy, 405.
Sewerage, Utilization of, Carpenter, 509.
Sewers, Toronto, Macdougall *et al*, 337.
Sewer-gas Prevention, Ed., 159.
Sewer-gases, Suction of into Service Pipes, Sweet, 143.
Should Dwelling Houses be Plumbed? Bayles, 529.
Small-pox, 86, 93, 165, 173, 180, 283, 369, 475, 547, 563.
Small-pox and Neglect of Vaccination in Brooklyn, Ed., 547.
Small-pox, Prevention of, 353.
Small-pox, Worse than the, 169.
Smart, C., M.D., U.S.A., Water Analysis, 385.
Soil-moisture, Dangerous, in New Orleans, Fenner, 20.
Starvationists, 60.
State Medicine, Rauch, 193.
Steam Heat as a Disinfectant, Sufficiency of, Holt, 331.
Substitution, 383.
Sugar, Watered, 222.
Sweet, H., M.D., Suction of Sewer-gases into Service Pipes, 143.
Syphilis: The Prevention of its Dissemination, Alsdorf, 145.

Tea, Bell, 312.
Thomas, W. R., Lead Poisoning from Drinking Water, 262.
Thornton, G. B., M.D., Six Years' Sanitary Work in Memphis, Tenn., 347, 424.
Tidy, C. M., M.D., The Treatment of Sewage, 405.
Toronto Sewers, Macdougall *et al*, 337.
Trumpeter, His own, 508.
Turner, T. J., A.M., M.D., U. S. N., Museum of Hygiene, 481.
Typhoid-Fever, 284, 370, 475.
Tyrotoxicon, Vaughn, 300.
Tyrotoxicon Poisoning, 162.

Unenviable Distinction, 123.

Vaccine Toothpick, A, 144.
Van Bibber, W. C., M.D., Use of Alcohol, 343.
Vaughn, V. C., Professor, Tyrotoxicon, 300.

Water Analysis, Smart, 385.
Water, Drinking, Lead Poisoning from, Thomas, 262.
Water, Drinking, Tests for Organic Impurities in, 111.
Water Impurities—Some Simple Tests, 356.
Water Supplies of Towns and Cities, 114.
Water Supply of Memphis, Tenn., 375.
Water Supply of Philadelphia, Pa., 118.
Water-proof, Brickwork, How to Render, 414.
Wells, Spencer, Increase of the Duration and Economical Value of Life, 403.
Whooping-Cough, 370, 475.
Wight, O. W., M.D., LL.D., Proposed New Plan of Public Sanitation, 205.
Williams, H., M.D., The Climatic Treatment of Phthisis, 41.
Wingate, C. F., American Tenement Houses, 289.
Woollen Clothing, Ed., 267.

Yale College Observatory, 383.
Yellow-Fever, 93.
Yellow-Fever Inoculation, 95.
Yellow-Fever, Removal from the Air of the Dust or Particulate Material Supposed to Produce, Prince, 345.
Yellow-Fever, The, Commission, 99.

2 gal
454+